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• **Highways** have been safeguarded by reflector buttons for years, so why not all the mines? This reasoning was back of an investigation carried out in a northern Illinois longwall mine the past two years to determine just what the possibilities of reflector-type signals were and how they should be used underground. K. N. Banthin gives the details in the article starting on p. 43.

• **Timber treatment** to prolong its useful mine-life is right in line with all other modernization plans of coal production. How a new treating method employing preservative chemicals mixed with a colloid is applied to timber of various types and the results secured by osmotic pressure and diffusion which carries impregnation to a depth of many inches will be told in an early issue by Jack Edwards.

• **Mechanical** slope driving has proved a money-saving operation at a few properties in the past. Never before, however, has the combination of mechanical loader and conveyors been applied for a more rapidly advanced and lower cost slope than that completed by Sahara Coal Co. Charlie Lambur, who was in charge of this work, tells the story with pictures, sketches and tabulations in the article beginning on p. 31.

• **If the measures** did not pitch and were not so far to sea, the submarine mines in Cape Breton at their present depth would be well suited to complete and safe extraction at reasonable cost. Consideration now is being given to mining other beds than the Phelan and spreading the mine area along the shore instead of seaward. This development will be described in an early issue by R. Dawson Hall.

• **Steel props,** like all mechanisms, have had to pass through the fires of criticism and revision. The first designs did not meet the desires of the user and, with experience, the user himself changed his viewpoint. In the second article of his series (see p. 49), Dr. Wuerker explains how steel props can be made to give a more flexible service than wood and at a lower cost per ton.

• **Northern West Virginia** has established an enviable record in recent years for low-cost production—the lowest, with one exception, for any deep-mine district in the country. Increasing adoption of mechanical loading and other modernization methods have made this record possible. Operating practices at the mines which are leading in this program will be featured in December Coal Age—our 19th Annual Model-Mining Number.

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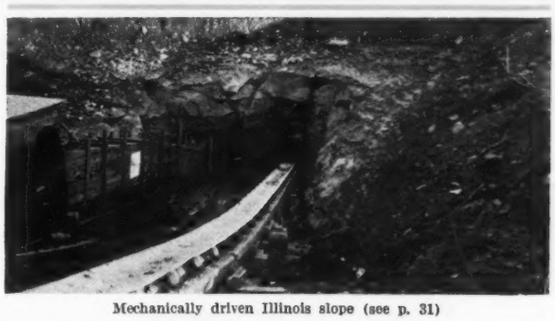

Mechanically driven Illinois slope (see p. 31)

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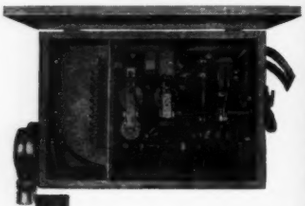

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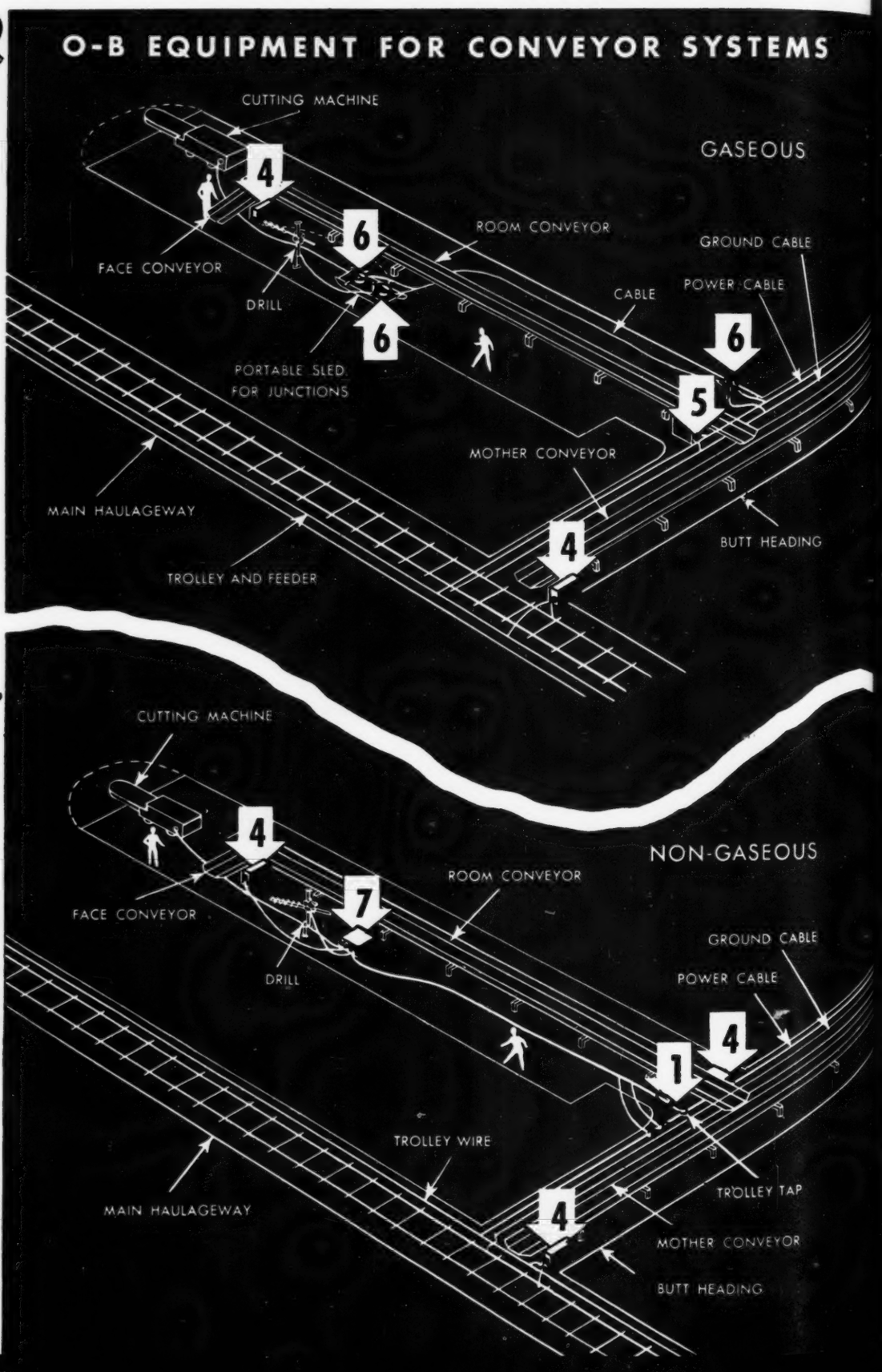


COAL AGE

Established 1911—McGraw-Hill Publishing Company, Inc.

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

SYDNEY A. HALE, *Editor*

September, 1939

Pertinent and Impertinent

• WORD from Washington is that argument on prices and how to figure them is now under way at the Bituminous Coal Division of the Interior Department and bids fair to last until some time in October. 1940?

• WITH the extension of capital-stock tax-return filing time to the end of August without delinquency penalties or interest if paid on or before that date, our Uncle Samuel again indicated his knowledge of the fact that tax money and more tax money is harder and harder to get.

• HAROLD L. ICKES, arch enemy of the basing-point system for cement and steel, now administers the basing-point set-up prescribed in the Guffey act. Thus a system of price coordination and control denounced when initiated by private industry becomes wholly necessary, desirable and even laudable when enforced by government bureaucracy. Or does it?

• INSURANCE against material hazards has long been accepted as a matter of course by prudent business management. Tipples are insured against fire; underground workings against accident. Too few, in the coal industry at least, have been sold on the idea of insuring against the perils of change—the losses caused by competitive progress and invention. That is where research enters the picture. Research, to use the phrase of Clyde Williams, director, Battelle Memorial Institute, is "insurance capital" invested to maintain the position of an industry. Time to think about adequate coverage?

• WHEN oil-treated coal was introduced in power plants, engineers welcomed the forward step. But soon industries using belt conveyors to handle coal experienced trouble because natural rubber—alas—is allergic to oil. How to retain the advantages of oil-treated coal without any entirely new coal-handling system became the problem. Stamford Gas & Electric Co. solved it by substituting a synthetic rubber with a coal base—in this case, neoprene—for the natural product. Thus coal as a raw chemical material came to the rescue of oil-treated coal as a fuel.

• WASHINGTON may fix minimum prices—and, if the levels are not too high, the public may accept them with little squawking. Trying to impose a grotesque coordination scheme which inhibits the consumer's choice of supply, however, is something else again. No buyer relishes being told where he must spend his dollars and he usually finds ways to disregard such mandates.

• "GOOD public relations," says President Liversidge of the Philadelphia Electric Co., "must be earned. They are never a gift from Heaven. It is what we do that counts, not what we say." Discouraging to indolent management that thinks all that is necessary is to set up a separate staff of experts or engage outside specialists and then forget it. There is neither magic nor hocus-pocus about sound public relations; their achievement depends upon a mode of industrial living which merits them.

• UNDER the common law, a domestic animal is given the right to one bite, just as only too many give a hazard a right to one injury. But any engineering worthy of the name does not allow the first injury to happen and muzzles the hazard before it takes its first toll. One injury is one too many; once is too often. After the right way of performing a job is estab-

lished, or as soon as the right way is determined, education of the workman must follow, and, when the man is educated, the correct —and safe—procedure must be enforced.

• JOHN L. LEWIS' latest outburst strengthens the hands of those who believe the labor movement should be skimmed of most of its present leaders, while Vice-President Garner gathers the butter made by the curdling epithets so tempestuously churned into the situation. John L. may prefer sweet or buttermilk to other potables and poker is not one of his diversions, although he has been accused in times past of gambling with the welfare of his constituents. Incidentally, intemperance in the use of words has been known to react as unfavorably in some circles as strong drink and poker playing.

Not So Slow

HOW MUCH mines in this country and in Great Britain have in common in their sales problems is strikingly demonstrated in the latest annual report of the British Coal Utilisation Council. Teaching the consumer more efficient combustion methods as a means of keeping him on coal, how to get remunerative prices for slack, meeting oil competition and finding new uses for coal are all subjects covered in the current report. Smoke abatement and the perversion of this movement by competitors also has its place. In fact, with a few slight changes, the document might easily be mistaken for a report of Anthracite Industries, Inc., or the National Coal Association.

Our British cousins not only have taken advantage of national and district expositions with attractive exhibits but also have a traveling display "to reach the smaller towns and villages where opportunities for propaganda, other than by press advertising, are practically non-existent." The display serves as a demonstration exhibit, a carnival piece and as an exhibit for local shows. In six months last year, this traveling display covered over 5,200 miles, visited 280 towns and villages, took part in five carnival processions, walking off with two prizes, and staged exhibits at a dozen local shows or fairs.

In these days of sharp inter-industry competition, merchandising-minded men must explore all avenues of legitimate promotion. The Coal Utilisation Council report is proof that the British interests are keenly alive to that fact. They have learned some things from us; maybe we also can profit by their experiences. How well, for example, are we capitalizing on county-fair opportunities on this side of the pond?

Who Burns Coal?

AFTER A LAPSE of several years, detailed figures on fuel consumption by specific groups of manufacturing industries are again available. Resumption of this series of biennial reports, discontinued by the Bureau of the Census in 1931, will be welcomed by all students of fuel economics. Less now need be left to determination by a process of imperfect elimination. No longer is it necessary to lump general manufacturing and domestic coal consumption in the statistical set-up.

Data for 1937—the year covered by the present report—show that manufacturing industries consumed 6,526,000 tons of anthracite, 162,961,000 tons of bituminous and the coke equivalent of 63,291,000 tons of coal. Oil and gas consumption by the same industries represented the equivalent of 163,508,000 tons of coal. In other words, coal and coke accounted for 58.7 per cent of the total fuel consumption by these groups. Moreover, this percentage understates coal's position because the figures upon which it is based exclude purchased electric energy.

Solid fuel dominated in thirteen of the fifteen major groupings in the Census classification. Gas led by a small margin over coal in the printing trades—not a large consuming group—and oil had a slight edge in the non-ferrous metals field. Petroleum refining and the iron and steel industry were the largest gas consumers; these two groups used over 68 per cent of the total for that fuel, although coal and coke consumption on an equivalent basis was actually greater than gas and oil in the steel industry. Gas consumption, reduced to an equivalent coal basis, outranked oil by a 4:1 ratio in total consumption by the manufacturing industries.

The picture as a whole is certainly not unfavorable to coal. Satisfaction with the showing, however, should be tempered by the knowledge that, if coal is to continue to maintain and, still more important, to improve its position, there can be no let-up in the drive for modernization and lower costs. No mine can long hope to sell in a competitive market unless its prices are competitive. The evidence on that point is incontrovertible. And profitable selling under these circumstances is possible only through efficient operation with cost-cutting equipment.

Diagnosis Not Enough

INSPECTION OF MINES serves no useful purpose unless followed by remedial measures. Too much deliberation and too little determination get nowhere. Effort should be made to convert fact finding into appropriate action. Many are the methods. Charging cost of accidents to the cost of the coal produced at each mine or section is one way. Setting a bogey at which to aim is another. Competition between companies, mines and sections is a third. Stressing safety as a glorious objective rather than a drab duty has often turned a poor record into a good one.

To the individual, safety should be even a larger consideration than wages and hours, for an accident will end both for a long while or perhaps forever as far as he is concerned. To the operating company, it is equally important, for wages and hours usually are the same for all competing operations in a given area, whereas safety is an economy that the best managed companies alone can attain. The savings safety effects show up in the profit sheets.

NEW ILLINOIS SLOPE

+ Driven at Low Cost

With Loader-Conveyor Set-Up

By C. H. LAMBUR, JR.
Formerly Mining Engineer
Sahara Coal Co.

• Use of the loader-conveyor combination in mechanized mining is now well established. Employment of this same combination in slope driving, however, is, to say the least, unusual. But Sahara, in the development of its new mine in Saline County, Illinois, has successfully demonstrated both the possibilities and economies of this application to heavily pitching slope openings. Charlie Lambur—newest addition to *Coal Age* editorial staff—who was associated with the Sahara project from its inception to its completion, gives the story of this job, performance data and costs.

AN AIR and material slope 8½x21x548 ft. on 15-deg. pitch and a belt slope 7½x15x606 ft. on 16-deg. 30-min. pitch were driven with a mechanical loader and conveyors by the Sahara Coal Co. in the latter part of 1937. The men employed in driving the slopes received their experience in rock work on the air and material slope, which was driven first. The following description is of the belt slope only, which procedure was fundamentally the same as that employed in driving the first slope. Driving the belt slope was begun on Oct. 1, 1937, and completed on Nov. 11, 1937. The rock strata in a longitudinal section of the slope are as follows.

0+00	—0+52.5	Surface soil
0+52.5	—0+85	Sandstone
0+85	—1+37	Soft shale
1+37	—2+23	Black shale
2+23	—2+28	Coal (No. 5A seam)
2+28	—2+49	Fireclay
2+29	—2+37	Black shale
2+37	—2+40	Limestone
2+40	—5+09	Black shale
5+09	—5+21	No. 5 coal seam (to be mined)
5+21	—5+24	Fireclay
5+24	—6+06	Black shale to bottom of dump hopper.

Dip of the strata is 2.7 per cent in favor of the slope (see Fig. 1 for columnar section).

Surface soil was removed by means of a ¾-cu.yd. bucket dragline. At the top of the slope two compressors furnished air at 100-lb. pressure to a common receiver which supplied the jackhammers. In order to remove the rock two jackhammers were put into operation drilling sloping holes of various lengths on 3-ft. centers. These holes were loaded and shot with 40-per-cent gelatin dynamite. Successive drilling and shooting of these sloping holes was done until grade was reached, and at a distance of 1+12 on the slope the full face was exposed to permit driving ahead on grade into the shale.

Until this time all of the rock was loaded by hand onto a chain conveyor which was cribbed up to permit discharging into a truck at the top of the slope. Because of the sandstone stratum at surface, which would cause excessive wear to a mechanical loader, and because the rock was too large for the mechanical loader to handle (surface shooting resulting in large pieces of rock), it was hand-loaded.

Having passed through the sandstone and with a shale face exposed, the slope was driven ahead by machine. Two jackhammers, unmounted, were used for drilling the face. All holes were drilled dry: 3 ft., 6 ft. and 9 ft. ¾-in. hexagonal steel was used with 1¾-in., 1⅝-in. and 1½-in. detachable bits. It was determined that a 25-hole round was best for driving the slope, using three delay electric blasting caps. Eight 8-ft. wedge holes were drilled in the center of the face and were shot first. Midway between the wedge holes and each rib three 7-ft. holes were drilled and shot with No. 1 caps. Along each rib three 6-ft. holes were drilled and shot with No. 2 caps. Along the bottom of the face

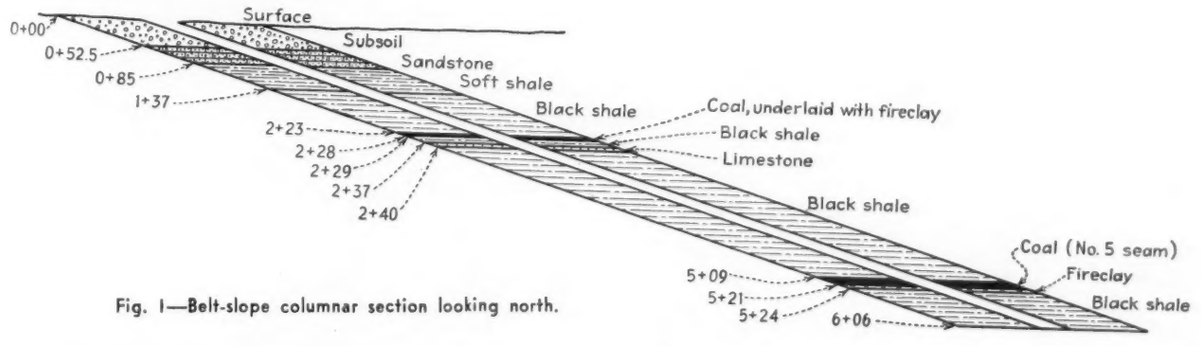
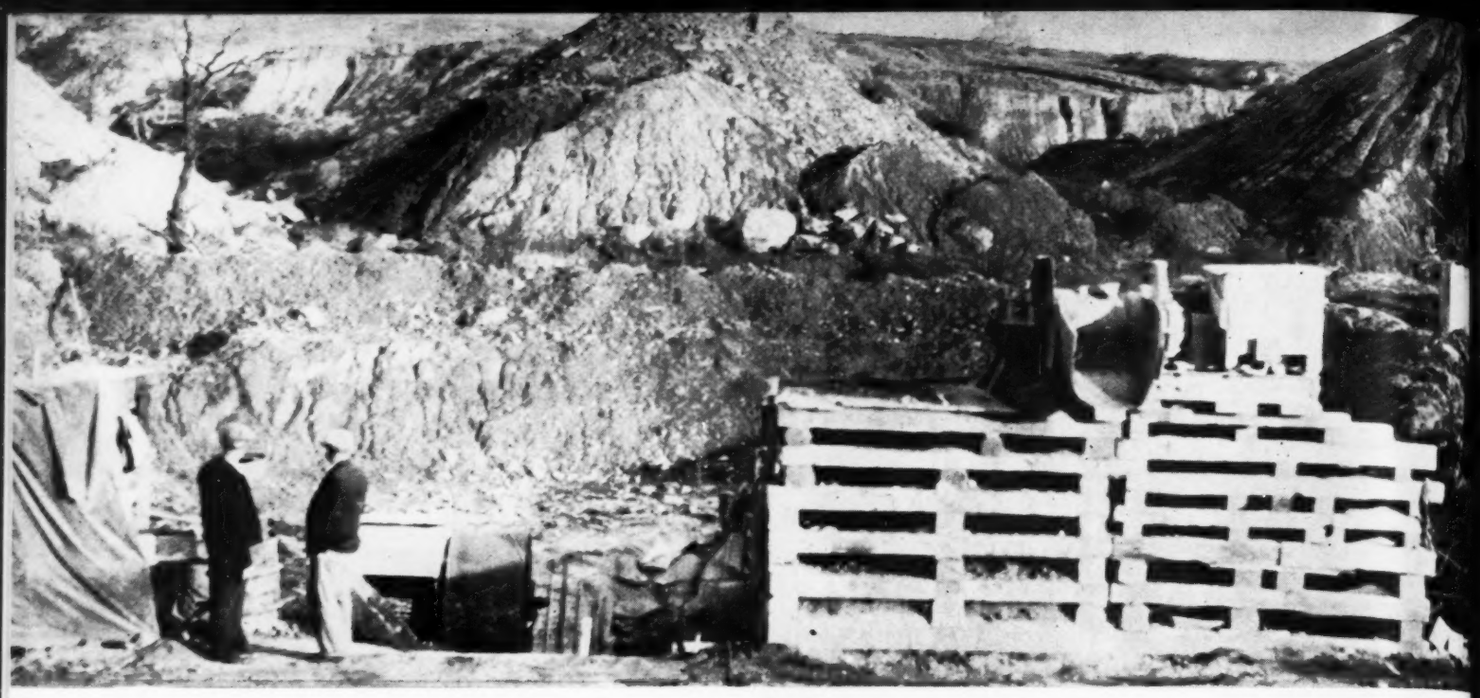
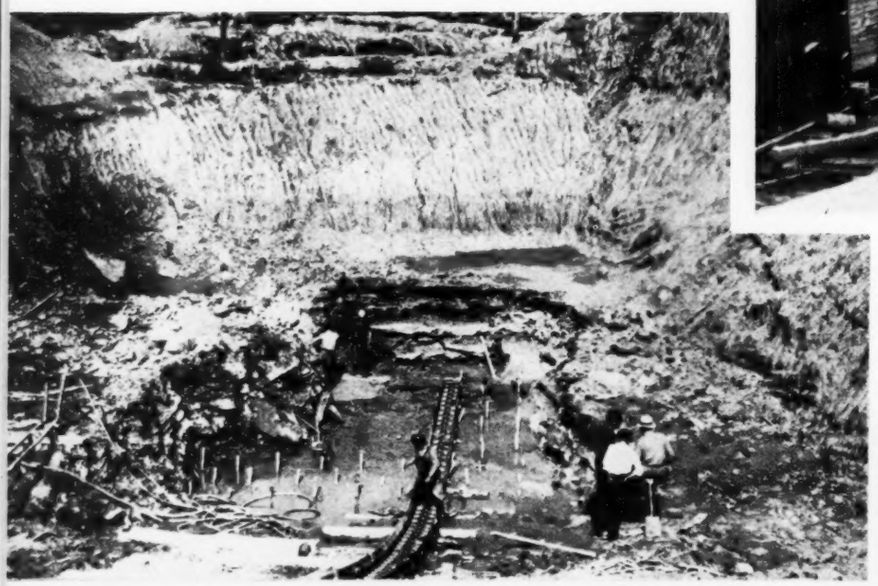


Fig. 1—Belt-slope columnar section looking north.

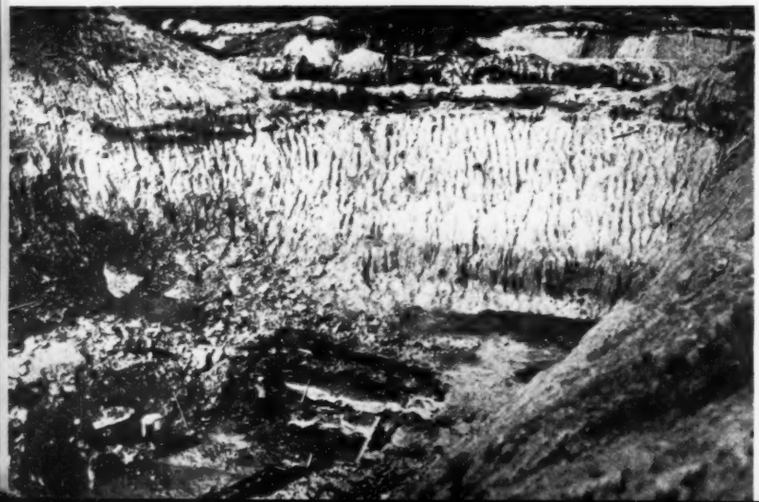


Above—Top of slope showing discharge end of 26-in. belt conveyor. Compressed-air receiver at extreme right. Rope from hoist to mechanical loader in center foreground.

Right—Mouth of slope showing fan supplying air and 26-in. belt conveyor emerging from underground. Note the massive sandstone stratum at surface.



Center left, lower left and lower right—Views of air and material slope at beginning of operation.



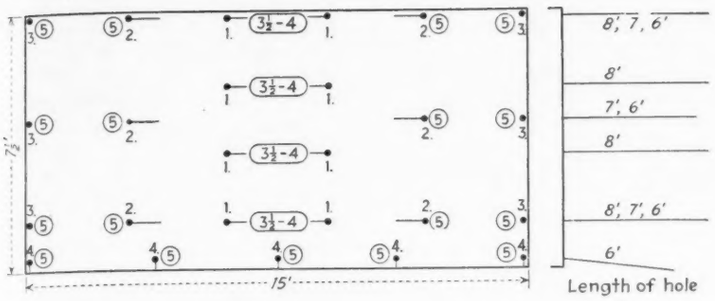


Fig. 2—Drill round: order of firing, 1; sticks of dynamite (5); 40-per-cent gelatin dynamite, size 1¼x8 in.

five 6-ft. holes were drilled on the pitch of the slope and shot with No. 3 caps (Fig. 2).

Three and one-half to four sticks of 40-per-cent gelatin dynamite were used in the wedge holes and five sticks in the remainder of the holes. In all holes the cap was placed in the second stick from the collar of the hole and was secured in the dynamite by means of two half hitches around the stick, cap toward bottom of hole. Caps were connected in series and fired with plunger-type blasting machine. Clay tamping in 1¼x14-in. bags and wooden tamping sticks were used. Pull averaged 5 ft. per fall.

Having driven into the shale, a mechanical loader was used to load the rock onto a chain conveyor. At a distance of 230 ft. down the slope the chain conveyor was replaced by a 26-in. belt conveyor. This was necessary because it was found that when the chain conveyor was extended to too great lengths it did not operate efficiently. For the remainder of the slope the chain conveyor was used from the face to a point 40 ft. back from the face and discharged over a special long-neck pan onto the belt conveyor.

Lengthened Every 120 Ft.

The belt conveyor was lengthened every 120 ft. of advance. Though it could have been extended every 12 ft. of advance, it required almost one complete shift to add the 12-ft. length in making belt splices, breaking and bringing belt down, moving tailpiece and tearing out chain conveyor. So it was more convenient to add 120 ft. of belt at a time, using the chain conveyor in conjunction with it. Besides the time element, if the belt conveyor alone had been used, rock from the discharge end of the mechanical loader falling onto the rubber belt would have injured it. Another point was that during shooting, the rubber belt would have been more damaged than the chain conveyor. To add 120 ft. of belt required from 24 to 36 hours, which includes the above-mentioned delays. The belt had to be cribbed up to prevent dragging in the dirt on the under side. Air to the working face was supplied by using brattice along the left rib from the surface fan to a point back from the face and then utilizing a booster fan and Ventube to carry the air from the end of the brattice to the working face.

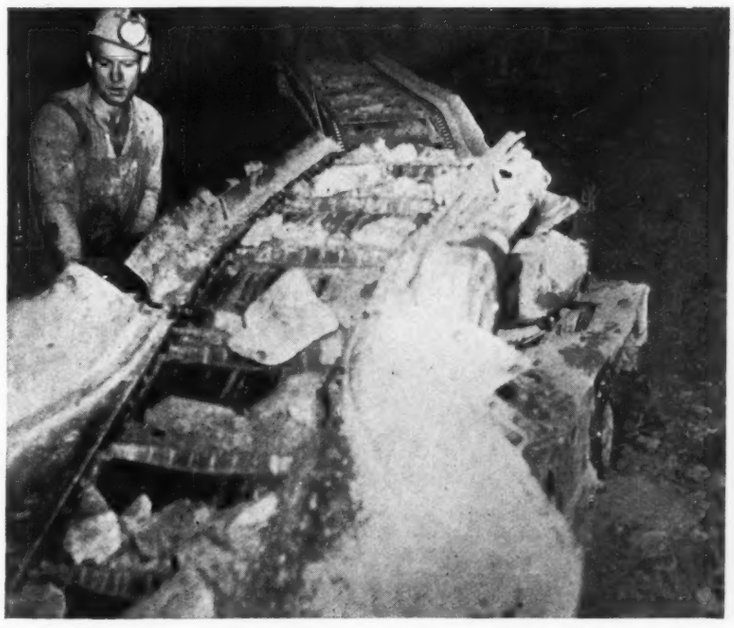
Operating procedure was as follows: Assuming that one shift has just ended, a round has been fired and is ready to be loaded by the oncoming shift, the mechanical loader commences loading along the left rib and clears a path up to the face. As soon as there is sufficient room to permit operation of the jackhammers, drilling begins on the left side of the face and follows the mechanical loader across the face.

On an average, half of the drilling was completed by the time the machine finished loading, whereupon it was then moved back from the face. The machine operator then assisted in loading, tamping, and preparing the face for shooting. The loading machine was never damaged by flying rock. To escape damage from shooting, the end of the chain conveyor had to be protected by a covering of rock and timber. Most of the time the mechanical loader required the attention of two men, one to operate and one to break rock, guide the end of the loading conveyor and shovel spilled rock.

Drilling and loading at the same time, as outlined, one and one-half to two falls were loaded out per shift. Sometimes drilling was not done until after loading. Then the sinkers were needed to timber (props only), and at such times about 1½ hours was required to drill the face after rock had been loaded out. Because of rain and a water stratum, it was necessary to dig a sump at 2+00 on the slope. A centrifugal pump with capacity of 150 g.p.m. delivered water from the sump.

The roof was fairly well self-supporting immediately after shooting but slabbed off upon continued exposure to the air. Timbering consisted of props set at varying intervals, 5- to 10-ft. spacing, in two rows down the slope. One row of props was placed near the left rib, to which brattice boards were nailed, and the other row near the right rib to protect the 26-in. rubber belt. Top was carefully tested and all loose rock taken down after each round was fired to eliminate the necessity

Mechanical loader in operation on 16-deg. 30-min. pitch discharging onto chain conveyor.



for timbering at the working face.

The engineering department maintained constant contact throughout the operation. From survey, the point of beginning and desired azimuth were established, slope and grade stakes were set to guide the dragline, with grade and line sights furnished daily. Operation was for three shifts of seven hours each with one-half hour off for lunch, and one-half hour between shifts. No work was done between shifts.

Sinking crew consisted of the following men per shift: four sinkers, one Joy operator, one boss, one truck and driver, one pumpman (maintenance man) working on first shift only, five days per week.

To assist the Joy loader in moving back from the face, a "home-made" electrically operated drum hoist was installed at the top of the slope, with a signal line to the Joy loader. Drill bits averaged 25 ft. per bit head.

Originally eighteen holes per round were used—six in wedge, six on each side—and extra holes in bottom when needed. At first, nine sticks of dynamite were used in the wedge, seven in the lifters, and five to six sticks in the others.

Progress of 22 to 30 ft. per day was made under best conditions. Delays included: 1 hour, power off; 1 hour, compressor trouble; 1½ hours, engineering; 8¾ hours, conveyor trouble; 3 shifts, 4 hours, holiday, and six shifts, digging sump, or a total of 11 shifts, 2¼ hours.

Before deciding upon using a mechanical loader many authorities on slope driving were consulted. The opinions expressed were very contradictory as to the ability of a mechanical loader to operate on such a pitch. Some favored the idea but many contractors with years of experience in rock work stated emphatically that it would be impossible to use the mechanical loader. As a result, a second-hand machine was purchased in order that too much money might not be invested should it prove impractical to use, though the used unit required much more frequent adjustment and repair than new equipment. The fact that the second-hand loader was able to operate only 53 per cent of its total loading time is evidence that costs can be appreciably lowered by using new equipment. During periods when the loader was being repaired, hand-loading required two to three shifts to load out one fall, as compared to 1½ to 2 falls loaded out per shift when using the machine.

Equipment on hand was used, as far as possible. The only equipment purchased was the mechanical loader, chain and belt conveyors, jackhammers, and 12-in. blower fan.

Of the total 4,008 cu.yd. excavated, 1,185 cu.yd. of earth was handled by dragline.

Labor required in driving the slope totaled 720 man-shifts. The cost of engineering and supervision, as well as power and supplies, was close to 1.7 times the cost of labor, making the total sinking cost 1,939 man-shifts, figuring engineering and supervision, and power and supplies in terms of labor (table II). Capital charges for equipment are not included in this cost. However, it does include the cost of all extra labor as well as repair parts, tools, electric cap lamps, explosives, drill steel and bits, timber, etc.

Table I—Summary

Size slope	7½x15x606 ft.
Degree of slope	16 deg. 30 min.
Type of loader	Joy 5 BU.
Type of hoisting	Joy 15-in. chain and 26-in. belt conveyor
Time of driving	120 7-hour shifts
Rate	5 ft. 3 in. per 7-hour shift
Crew	6 men loading, drilling, shooting and timbering
Total Cost see Table II	
Total cubic yards	4,008

Remarks: Loader second-hand and used only 53 per cent of actual loading time. 1,185 cu.yd. was earth and was loaded with dragline.

Both slopes are to be concrete lined for their entire length. The air-and-material slope will be partitioned in order that air may pass through half of it. Tracks will be laid in the other half to transport material into the mine. Belt slope will have steps in the floor slab and will be used as a manway, and along one rib the 54-in. rubber belt will be installed to convey coal or rock to the surface at 1,000 tons per hour.

The Sahara Coal Co. is well satisfied with results obtained in mechanized slope driving and will not hesitate to drive other such slopes should the occasion be presented.

Table II—Approximate Cost of Belt Slope Figured on Man-Shift Basis

	Labor	*Engineering and Supervision*	*Power and Supplies*	*Total*
Total for belt slope	995	220	724	1,939
Cost per cu.yd. (4,008 cu.yd.)	0.248	0.055	0.181	0.484

Chain conveyor discharging onto belt conveyor; brattices along left rib and props supporting roof.

Equipment Log

1 ¾-cu.yd. bucket dragline, Bucyrus-Erie 37 BU.
1 Chicago Pneumatic water-cooled air compressor.
1 Sullivan water-cooled air compressor.
1 16-ft.x46-in. cylindrical receiver.
4 56-lb. Gardner Denver jackhammers (unmounted) using ¾-in. hexagonal drill steel of 3-, 6- and 9-ft. lengths using 1¾-, 1⅝- and 1½-in. patented detachable Timken bits.
1 Joy loader, 5 BU, 26 model.
1 Joy belt conveyor, Type U 166-7A, 26-in. belt.
1 Joy 15-in. chain conveyor 300 ft. long, Type 150.
1 Sirocco blower fan, size 9.
1 12-in. blower fan with 100 ft. of vent tubing.
1 4x5 Deming plunger pump, 31.68 g.p.m., 80-ft. head.
1 Dayton-Dowd centrifugal pump, size 3, 150 g.p.m., 80-ft. head.
1 Home-made electric drum hoist.

POWER SAVINGS MADE

+ By Careful Study of Ventilating Plans

By F. FRASER MacWILLIAMS
Johnstown, Pa.

ALL too frequently, ventilation as well as pumping receives much less careful consideration than less important problems around a mine. This despite the fact that these two items in many cases are responsible for 60 per cent or more of the total power bill. These subjects should be thoroughly considered from the very start of the mine if burdensome expense at a later date is to be avoided. Areas of airways and methods of obtaining these areas have a large bearing on the results attained. Costs of power should be carefully balanced against that of removal of material in order to obtain the best yearly costs.

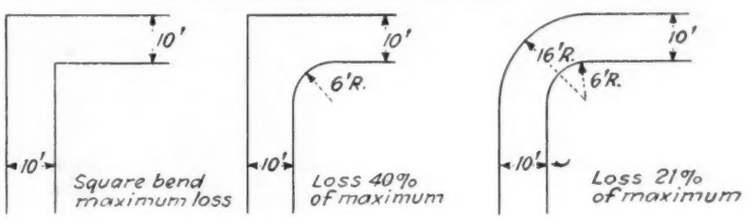
As an example, we may assume a mine requiring 100,000 cu.ft. of air through 10,000 ft. of airway deciding on 100 sq.ft. area of airway. This can be obtained by opening up a single airway 10x10 ft. or 5x20 ft. or two airways 5x10 ft. The total square feet of rubbing surface is 400,000 for the 10x10 airway, 500,000 for the 5x20, and 600,000 for the two 5x10. Assuming the coefficient of friction to be 0.0000000075 and neglecting turns, the water gages necessary to produce the assumed flow will be 5.75 in., 7.2 in. and 8.65 in. respectively. From this, with 70 per cent over-all efficiency of motor and fan, 730 hours operation per month, and power at 1.5¢ per kilowatt-hour, the resultant costs are $1,057.35, $1,324.00 and $1,590.56, respectively. Thus the saving by use of the 10x10 airway over the 5x20 is $3,199.80 yearly, or $6,398.52 over the two airways.

The timber required, assuming 10-ft. spacing, would be 30,000 linear feet for the 10x10 airway. With the 5x20-ft., a center prop probably would be found necessary, thus requiring 35,000 linear feet of timber, while the support of the two 5x10 airways would require 40,000 linear feet. Thus the 10x10 airway will require 5,000 ft. less timber than the 5x20, or 10,000 less than two 5x10. Incidentally the center props mentioned above will increase the water gage required and monthly power cost of the 5x20 airway above the assumed figures, but they have not been considered, since no accurate information is available as to the exact percentage increase.

Assuming the life of the mine as twenty years, the question arises as to whether the total savings of $63,996 in the case of the 5x20 airway or $127,970 for the two airways plus the lower cost of timber will pay for the additional cost for removal of materials necessary for the 10x10 airway. This saving is based on twenty years' operation of 10,000 ft. of airway, which may not be strictly correct, since the full 10,000 ft. will not be in use until the mine is completely opened. However, the actual saving will never be less than two-thirds of this amount. The additional cost of the 10x10 airway depends to a considerable extent on the thickness of the vein of coal, as the additional height must be taken from the rock. Another economic question to be considered is the possible saving of approximately 65 per cent in power by filling in the spaces between timbers so as to present a smooth rubbing surface to the air. An even better solution, giving about 85 per cent saving, is to recess the posts into the ribs, thus presenting a smooth rubbing surface and increased area of airway. This saving, of course, must be balanced against the cost of filling in the first case and the extra timbering cost in the second case.

Bends add to the resistance and water gage required. Right-angle bends are the worst offenders, but even here considerable power can be saved by proper design. The pressure loss at such a bend can be reduced 50 per cent by simply cutting off the inner square corner on a 45-deg. angle, the length of the bevel being 8 ft. or more on a 10x10 airway. Cutting the inner corner on a 6- to 8-ft. radius will show a greater saving, and by curving the outer corner to about a 15-ft. radius a still greater saving can be made. A radius or bevel on the inner corner is particularly important, as it gives the greatest proportionate reduction in pressure loss. This is shown in the accompanying sketch. A great deal of experimenting has been done with radial vanes at bends and unquestionably they are of considerable value. Their saving is of secondary importance, however, compared to the much greater value of the curved ribs on radii as great as possible.

Streamlining airways to prevent power losses.



CHEMICAL PLANT SERVED

+ By Carbon Fuel Co. River Dock And 90,000-Ton Kanawha Storage

BARGE loading slips built at right angles to the river and coal-handling equipment designed for minimum labor are features of a combination river dock and storage plant built by the Carbon Fuel Co. on the Kanawha River near Marmet, 12 miles upstream from Charleston, W. Va. Normal rate of barge loading from railroad cars is 250 tons per hour and the maximum with extra labor is 400 tons. Stockpile capacity is 90,000 tons and the rate of reclamation and loading into barges is 125 tons per hour.

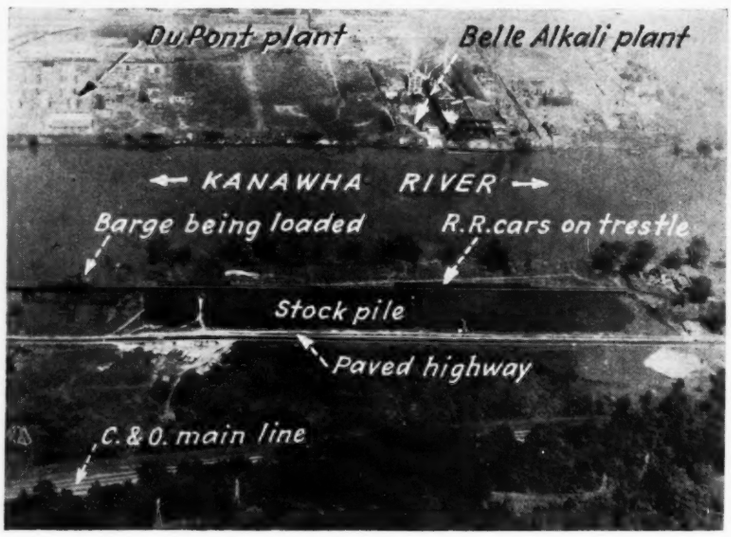
Principal among the reasons for building this river plant was the opportunity to furnish a constant supply of byproduct coal to the Belle works of the DuPont interests, the ovens of which are across the river and downstream one-quarter mile. Bradford switch, on the Chesapeake & Ohio main line, where the river dock and storage is situated, is 8 miles downstream from Cabin Creek Junction, which in turn is 17 miles from the Carbon Fuel Co.'s mines on the Cabin Creek branch of the C. & O. At the river site the coal company acquired 75½ acres of land and built one mile of 100-lb.-rail track. Completion of the Marmet dam on the Kanawha River one mile below Bradford switch, which provides a 9-ft. minimum stage, raised the water level to flood a small slough on the river property and this low area was utilized for the barge loading pool. It was dredged 20 ft. deep so that many years will elapse before cleaning becomes necessary.

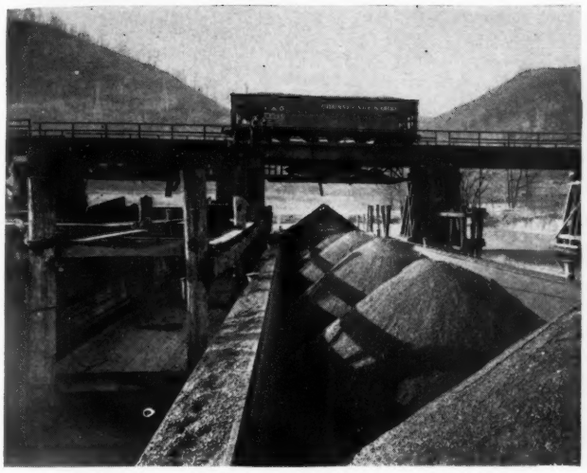
The layout consists of a trestle crossing the pool, or harbor, and extending upgrade 1,250 ft. back along the land beside the river. The single track of this trestle serves as a loaded-car storage for barge loading and also as the dumping track when stocking coal. Its capacity is thirty-three 70-ton cars. Coal company engineers desired to build this trestle on a 1-per-cent grade so that cars would start of their own accord but a ¾-per-cent grade was the maximum that the railroad company would serve. For starting cars on this ¾-per-cent grade a continuous rope haul is provided. Rope size is ⅝-in. and both the outgoing and return runs of the rope travel on the ties just outside the rail next to the river.

The hoist, a Mead-Morrison traction type unit driven by a 7½-hp. motor, is installed in a building under the trestle at the downstream end of the section traversing the harbor. The ropes are kept tight by a sliding head sheave at the extreme upstream end of the trestle and weighted to 1 ton. The car-pulling hook with short cable attached is coupled to the haul rope by a rope grip, or come-along, with clutch blocks held tight by a hand lever. Once started, the loaded cars travel back by gravity to the barge-loading point or, as the case may be, to positions along the trestle where they are to be dumped to the stockpile.

In the harbor under the trestle, space is provided for three loading slips accommodating barges 30 ft. wide. Two of these slips now are fitted with dump hoppers, feeders and chutes. Barges of both 1,000-ton and 500-ton capacities are loaded and the slip lengths are sufficient to accommodate two of the smaller barges in series. Use of a crossed-rope attachment to the barge-moving hoist,

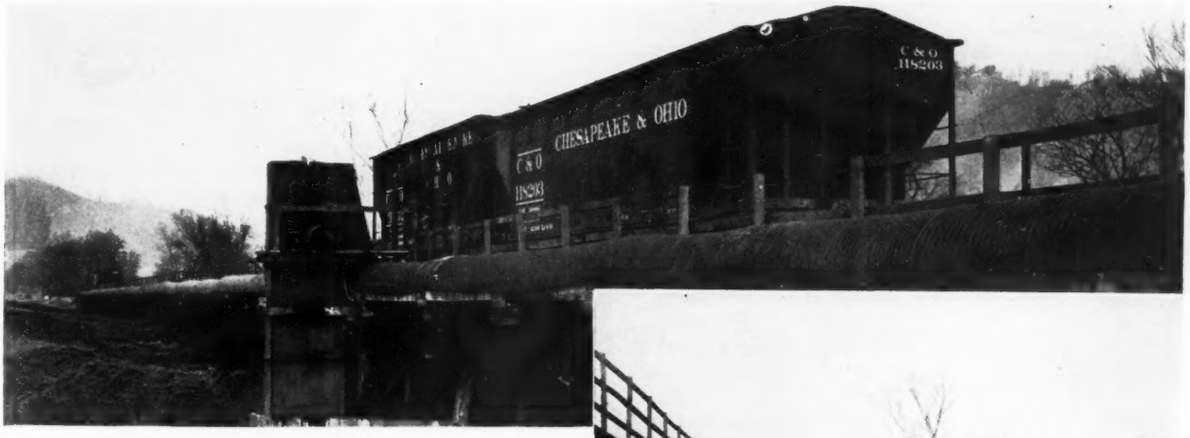
Air view of the harbor and stockpile.





A carload is spotted above the hopper and is about to be dumped for trimming the partly loaded barge.

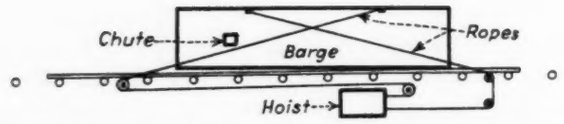
A hoist which operates a power drag-scraper system is mounted on the movable tower at left.



A scraper (left foreground) drags the coal to a hopper from which it is fed to the belt by an elevator. Curved corrugated sheets cover the belt, which is 850 ft. long.

A row of guyed posts back of the trestle serve for anchoring bridle ropes to which the scraper tail sheaves are attached.

Loaded cars are started down the ¾-per-cent grade by gripping the pull cable onto a rope driven by a traction hoist.



Crossed ropes simplify the tackle equipment necessary to move a barge back and forth under the loading chute.

as indicated in the accompanying sketch, makes it possible to control a barge under the loading chute without the long ropes and distant tail sheaves that would otherwise be required. This hoist is a double-drum unit, also Mead-Morrison, driven by a 10-hp. motor.

Reciprocating feeders of the double center-feed type driven by 7½-hp. motors deliver from car hopper to chute. Ordinarily two men work in a railroad car clearing it of coal, and it is with this shovel labor that the normal tonnage of 250 per hour is loaded into the barges from the railroad cars. With four men working in the railroad car the rate can be boosted to 400 tons. For the most part the coal handled over this river plant is minus 3-in. or smaller. However, some minus 4-in. coal has been stocked and loaded.

Storage Area 150,000 Sq.Ft.

Ground space 150x1,000 ft. along the upstream end of the trestle and on the side away from the river is available for storage. The coal is distributed and piled over the area by a drag scraper operated by a double-drum 75-hp. electric hoist mounted on a movable head tower 35 ft. high. This tower operates on a 12-ft.-gage track and is heavily weighted with concrete. From a high booth on the tower the operator has a view of the top of the coal pile and over it can see the dumping space under the trestle. The rope take-off sheaves are located at the top of the tower and are swiveled to accommodate any angle of pull or direction of ropes.

A Crescent scraper bucket of 2½ yd. capacity is used and its performance has proved far superior to that of a locally made bucket with which the system was first equipped. This Crescent bucket and the movable tower were made by Sauerman Bros., Inc., of Chicago. Tail-sheave and snatch-block anchorages are provided by a row of guyed posts, or piles, along the opposite, or river, side of the trestle. With proper positioning of the snatch block by using bridle ropes attached to the posts, the scraper bucket can be pulled back under the trestle to drag out toward the head tower the coal that has been dumped from the cars.

Of necessity the coal pile is built sloping and with its greatest depth along the tower track. Twenty-five feet is the convenient maximum depth, but as an experiment the pile was carried to 36 ft. in one place. Temperature readings taken in test pipes indicate that most of the heating occurs near the surface. During the two years of stocking experience the power drag-scraper system has been pressed into service several times to uncover hot spots, but no coal losses have occurred.

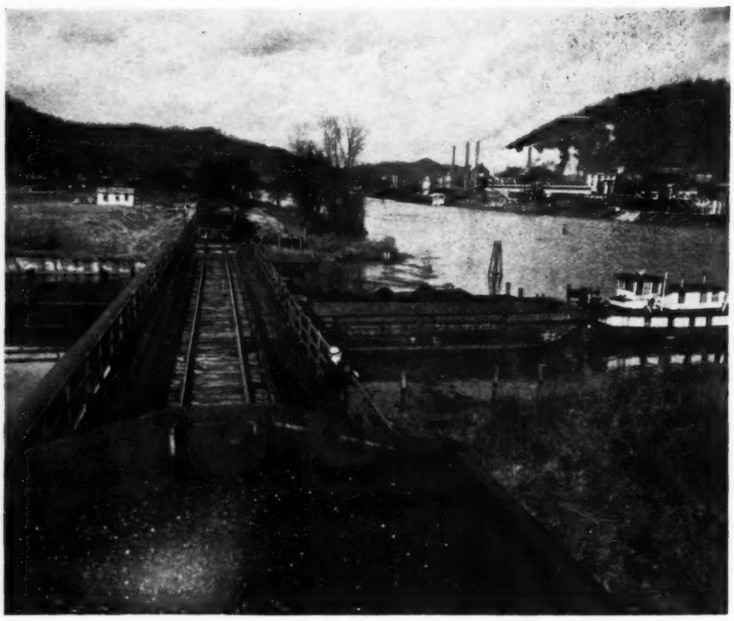
Coal reclaimed from the stockpile is transported in the upstream direction to the barge-loading slip by a 24-in. belt 850 ft. long installed along one side of the trestle at track level. At its distant end, which is 350 ft. short of the end of the stockpile, the belt is fed by an elevator which takes the coal from an open-top hopper sunk below ground level.

The coal is moved from the stockpile to this hopper by the drag-scraper system. Bridle ropes and snatch blocks are arranged so that coal is dragged toward the elevator at right angles or parallel to the trestle, or at any cross angle. A second hopper and elevator are installed closer to the harbor to accommodate that half of the coal pile. One thousand tons in 8 hours is the maximum capacity of barge loading from the stockpile.

Elevators, belt conveyor, hoists and barge-loading feeders were supplied by the Robins Conveying Belt Co. Idlers have anti-friction bearings and the belt for its entire length is covered with galvanized corrugated steel sheets bent to a half circle. Power for driving the eight motors of the plant is purchased at 4,000 volts and is reduced to 220 volts by three 50-kva. transformers owned by the coal company. Power-factor correction is supplied by a 30-kva. capacitor installed at ground level beside the transformers. Capacitor and transformers are new units and were purchased from the General Electric Co. Three No. 4 A.W.G. trolley wires carry the three-phase 220-volt power to the movable head tower of the drag-scraper system.

E. B. Pearse, formerly of the mining department at Carbon, is superintendent of the river dock and storage. A rear room in a small brick building housing his office contains lockers and shower facilities for the employees. Mr. Pearse reports to the Charleston office, where C. A. Cabell, president of the company, and E. C. Hanna, secretary, have their headquarters. Carl Scholz, of Charleston, acted as engineering consultant on the design and building of the plant.

View of the harbor from the top of a loaded car. The car in the background stands above the dump hopper of the downstream slip. Across the Kanawha River at the right is the Belle chemical plant.



OKLAHOMA STRIP PIT

+ Combines Mechanical and Hand Loading To Increase Lump Output

By IVAN A. GIVEN
Associate Editor, Coal Age

SERVING a market area where lump and stoker both are in good demand, Seneca Coal & Coke Co. has set up both pit and preparation activities at its Broken Arrow No. 4 stripping to produce the maximum tonnage of both sizes. As a result of pit revisions, shovel loading, which not only broke up the coal but also made it difficult to keep it clean, was abandoned in favor of a combination of hand loading into skips and mechanical loading with an underground-type caterpillar-mounted mobile loading machine. Eventually, it is expected that equipment correctly adapted to handling skips will be put in service or additional mobile-loader equipment will be purchased. In the tipple, a special stoker-coal crusher has been installed to augment the natural output of this size by breaking down coarse coal when desired. And before it leaves the tipple, stoker receives a thorough dust-proofing application of the wax type.

One of the latest additions to the Sinclair stripping group, Broken Arrow No. 4 is engaged in the recovery of the Catoosa seam near the town of the same name in Oklahoma. Seam thickness averages 18 in. Underneath the coal is about 1 in. of fireclay and a hard limestone. The bottom is bumpy, making it difficult for the loading shovel originally employed to take up the coal without getting some fireclay at the same time.

Average depth of overburden is 30 ft. and the stripping limit is 35 ft. The overburden includes an average of 25 ft. of hard gray shale resting directly on the coal. This shale must be shot and for this purpose holes are made with a horizontal drill. To prevent the powder from shocking the coal, holes are drilled about 4½ ft. above it. Cut width is 65 ft., but the holes are drilled 10 ft. short on 30-ft. centers, as the spread of the charge gives the extra 10 ft. of width. Depending upon conditions, holes are charged with 150 to 200 lb. of pellet powder, and the yield per pound is about 9 cu.yd. of material.

Stripping is done with a Bucyrus-Erie 750-B electric shovel equipped with a 20-cu.yd. dipper, which replaced an earlier 16-cu.yd. unit. The new dipper (Bucyrus) is fabricated of welded "Man-ten" alloy. The shovel is accompanied by an electric bulldozer, one of a number installed at Sinclair operations following initial experience at the Tiger mine of the Hume-Sinclair Coal Mining Co. In these bulldozer units, the regular tractor engines are replaced by electric motors (*Coal Age*, p. 52, August, 1938), and the units are served by trailing cables on reels. In the unit at Broken Arrow No. 4, a Caterpillar D-5 tractor was modified for electric operation, and is fitted with a LeTourneau bulldozer.

Lump and Stoker Market

An electric shovel with 5-cu.yd. dipper originally was instal'ed to load the coal, but, in view of the particular market conditions and physical factors involved, it now is used only for handling skips and eventually will be shipped to another property to make way either for a crane or another mobile loading machine. Major markets for the coal are Nebraska and Iowa, with shipments going also to South Dakota, Kansas, Missouri, Texas and other States in the same general region. Both lump and stoker are in good demand in this market territory, which the Broken Arrow mines, including No. 4, can reach only through the medium of good quality and superior cleanliness. The Catoosa seam in this locality runs around 13,500 B.t.u., with a bed ash of around 3½ per cent and a sulphur content of less than 1 per cent. From these figures it easily can be deduced that the seam naturally is clean and could be shipped the same way if extraneous materials could be kept out during the loading cycle.

Bulldozing, hand shoveling and sweeping take care of material left on the coal by the stripper, but the fireclay under the seam is a different matter. The bumpy bottom made it susceptible even more to being picked up by the shovel formerly used, in spite of all efforts by the operator. The management, therefore, was faced with the alternative of finding a method of loading cleanly or installing washing equipment with its attendant expense. Furthermore, shovel loading reduced the output of coarse coal—another disadvantage of this type of coal getting, particularly under No. 4 conditions.

The upshot was the purchase of a Joy 11BU loading machine for part of the tonnage and a decision to go to hand loading into skips for the remainder—at least for the present. These practices were inaugurated for the winter season of 1938–39. The Joy unit went into service in September, 1938. It is the standard underground machine in all respects except that 3½ ft. was added to the length of the rear conveyor. With this addition, installed cost was approximately $15,000.

All the coal is taken the full pit width at No. 4, inasmuch as a firm bottom is available as a truck base under the skim of fireclay. In Joy loading, the machine normally takes the coal in slices about the width of the loading head, working from one side of the pit to the other. The coal is loosened by "pinning." In this operation holes are drilled in rows about 3 to 4 ft. apart, using

Hand loading into skips at No. 4. At left is the electric bulldozer used in pinning operations. The loading shovel now is used only for handling skips and will be replaced by other equipment if hand loading is continued.

Mobile loader bailing up the coal in Broken Arrow No. 4 pit. At the left, the bulldozer has run up against the two pins in the drillholes and is ready to shove them forward to break loose another section of coal.

Chicago Pneumatic air drills fed by a Schramm or Sullivan compressor. Hole spacing in each row is about 4 ft. Then, starting at one end of a row, steel pins made of old truck axles are dropped into the holes. Pins are used in pairs, and when the two are in place in adjacent holes a bulldozer (LeTourneau, Caterpillar R-5 gas tractor) is run up against them, as shown in an accompanying illustration, to break the coal loose. Hand-loaded coal is pinned in much the same fashion, using the electric bulldozer, which is detached from stripping service when loading is going on.

Hand and Joy loading permit the shipment of a 1x$\frac{3}{8}$-in. special stoker with an ash content running from $4\frac{1}{2}$ to $5\frac{1}{2}$ per cent. The change in loading methods raised the lump output from about 35 per cent with shovel loading to 51 per cent with Joy and hand work in January, 1939. This occurred in spite of the fact that the coal is on the tender side and breaks fairly easily. Output from the Joy averages consistently about 100 tons per hour, with the remainder of the average daily output of 1,600 tons coming from the hand loaders. One seven-hour loading shift is worked a day.

Haulage at Broken Arrow No. 4, now under the supervision of C. M. Guthrie, is performed with ten tractor-trailer units ranging in size from 6 to 20 tons. All are of the mechanical drop-bottom type, and the list is as follows: one A.C.F. tractor with 2-ton Sanford-Day semi-trailer; two A.C.F. and one Mack with 15-ton Sanford-Day trailers; two Autocars with 10-ton Sanford-Day trailers; and four Fords with 6-ton United Iron Works semi-trailers. The latter units are part of those which went into service at the Mark Twain mine of the Huntsville-Sinclair Mining Co. on June 1, 1932, when the Sinclair organization embarked on its tractor-trailer haulage program. The small units fit in well with Joy loading, and in all cases the back ends of the trailers have been cut down to $8\frac{1}{2}$ ft. above ground level to accommodate the rear conveyor.

Broken Arrow No. 4 coal is prepared in an all-steel six-track tipple designed and built by the McNally-Pittsburg Manufacturing Corporation. Sizes commonly shipped are 10-in. fancy lump, 6-in. lump, 6x3-in. furnace lump, 3x$1\frac{1}{2}$-in. nut, $1\frac{1}{2}$x1-in. chestnut (when not crushing for stoker), 1x$\frac{3}{8}$-in. special stoker and $\frac{3}{8}$-in. slack. It also is possible to load 1-in. slack and, of course, mixtures of any sizes desired. A McNally-Norton pick breaker is installed to break the lumps in the mine-run to a maximum of about 24 in.

Table I—Results of Screen Test on 1x0-In. Crushed Coal Made From 1½x1-In. Chestnut in a Special Stoker-Coal Crusher in Broken Arrow No. 4 Preparation Plant

Size Fraction, Inches	Per Cent
$1\frac{1}{2}$x1	1.47
1x$\frac{3}{4}$	17.31
$\frac{3}{4}$x$\frac{1}{4}$	39.33
$\frac{1}{4}$x$\frac{3}{8}$	13.57
$\frac{3}{8}$x$\frac{1}{4}$	8.65
$\frac{1}{4}$x$\frac{1}{8}$	9.54
$\frac{1}{4}$x10 mesh	4.13
10x20 mesh	3.54
Minus 20 mesh	2.46

Note—Coal is classed as "tender."

Table II—Dustproofing Practice at Broken Arrow No. 4 Preparation Plant in January, 1939

Size Coal	Gallons per Ton	Number Size 40 Nozzles in Use
Lump	0.5735	3
Furnace lump	0.4888	3
Nut	0.6692	3
Special stoker	2.2152	8
Chestnut	0.4761	3
Slack	0.6315	3

Average pressure, 100 lb. per square inch; average temperature at heater discharge, 180 deg. F.; coal treated with Waxol.

The coal then is conveyed up to the shakers, which separate it into the following: plus 10- or 6-in., 5x3-, 3x$1\frac{1}{2}$-, $1\frac{1}{2}$x1- and minus 1-in. Lump, furnace lump and nut—the three largest sizes—go onto picking tables and then to loading booms unless they are being incorporated into mixtures. Chestnut and 1-in. slack may be loaded directly, but as a rule they are processed for the production of special stoker, for which purpose two vibrating screens (Link-Belt and McNally-Pittsburg) are installed to take out the minus $\frac{3}{8}$-in. fraction from the 1-in. feed.

If the natural 1x$\frac{3}{8}$-in. size is insufficient to meet stoker demands, coarse coal up to 3 in. may be broken down in a 24x48 McNally-Pittsburg special double-roll stoker-coal crusher. Normally, however, only the $1\frac{1}{2}$x1-in. chestnut is crushed. With the growing demand, however, it is expected that more and more of the coal up to lump will be broken down. Although the coal is on the tender side, in one test when running $1\frac{1}{2}$x1-in. material through minus 10-mesh, fines in the crushed product aggregated only 6 per cent, while coal under $\frac{3}{8}$-in. in size totaled 28.32 per cent. Oversize was 1.47 per cent. Complete results of the test are given in Table I.

All sizes produced at Broken Arrow No. 4 can be dustproofed by the Waxolizing process, using the Viking dual heating system. Special attention is given to stoker and care is taken to apply sufficient Waxol fluid for a permanent job, as indicated in Table II, showing average consumption for each size in January, 1939. Preparation facilities at the mine include a laboratory, and an ash test is run on each car so that the dealer can be informed as to actual ash of each shipment he receives.

WATER AND CABLE BOREHOLES

+ Cased With Cement-Lined Cast Iron With Welded Joints and Floated to Place

By HOWARD J. THOMAS

General Superintendent
Alta Coal Co., Inc.
Cane Creek Mining Co.
Franklin Coal Mining Co.

TO INSTALL an 8-in. cast-iron pipe in a 304-ft. borehole at Summit mine of the Alta Coal Co., Inc., Sumiton, Ala., the water-displacement, or float, method was used in order to save the cost of providing heavy rigging and to insure against the possibility of accident. In two 6-in. boreholes installed to accommodate cables for a change in mine power, cast-iron pipes of 4.80-in. outside diameter were installed, and, as was the case with the larger pipe, the joints were bronze-welded.

This mine is a slope operation in the 25-in. Black Creek seam in Walker County. The 12-in. borehole serves as a discharge for an underground pumping station and one of the 6-in. holes contains an a.c. cable supplying the pumping station. The second 6-in. borehole is a part of an improvement whereby the former practice of a.c. cutting is being changed to d.c. and electric haulage is being installed to displace mule haulage.

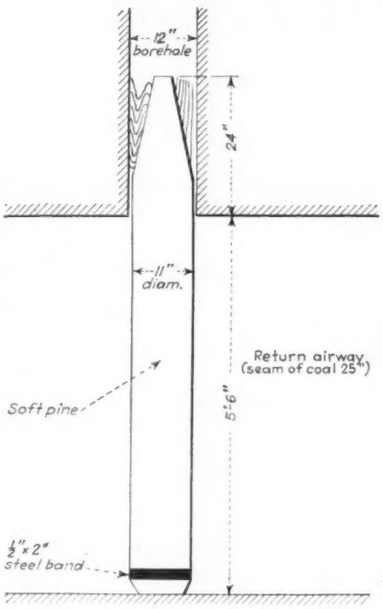
In this locality the water table is 60 ft. from the surface and below that level the water is highly acidulous. Experience indicated that installation of steel pipe would be a waste of money. Mono-cast cement-lined pipe made by the American Cast Iron Pipe Co., of Birmingham, was selected.

Being centrifugally cast in sand-lined molds without the use of cores, this pipe has a uniform wall thickness, a smooth bore and is of relatively high tensile strength. With the smaller size—inside diameter 4.04 in. and weight 17 lb. per foot—the manufacturer advised that with joints bronze-welded the pipe would have a factor of safety of 12 to 15 when supporting itself to the full borehole depth of 304 ft. This total weight, which is slightly over 2½ tons, was supported by the drilling rig. Two individual lengths of 16 ft. each were bronze-welded on the ground and then the 32-ft. sections joined by the same method while being held vertical above the hole.

Weight of the 8-in. pipe was 7 tons, and in this case a cap was welded over the lower end of the first section and the borehole allowed to fill with water, but the pipe was kept empty; therefore most of the weight was relieved from the handling rig.

To plug the lower end of the hole the method shown in the drawing was used. The soft pine plug was dropped in from the top. After the plug hit the bottom the canvas rings or flaps which are fastened to the upper taper were doubled back by the influx of water and soon formed a tight seal. On the right side, referring to the drawing, the canvas is shown in its normal position as the plug dropped through the hole and on the left it is shown doubled back and crowded into the tapered annulus to serve as a watertight gasket.

A canvas tailed pine plug was dropped into the hole to hold the water.



After the full length of the pipe had been assembled it rested on top of the plug at the bottom of the hole. To insure against the possibility of any deflection that might be present in the pipe, it was raised to a point sufficient so that it could be rotated by hand and then was clamped in this position. Neat cement wetted to the consistency of paste was poured into the space between the outer surface of the casing and the wall of the hole, resulting in the displacement of all water which had previously accumulated. This cement was allowed to "set up" for a period of ten days and then the wooden plug at the bottom was cut out and the metal disk removed. The applications obviously proved successful—in each instance the 75-g.p.m. flow of water was completely sealed.

On the outside surface of each length of pipe three cast-iron lugs ½ in. thick had been welded to insure centering the casing in the hole, thus leaving a uniform space for the grout which was poured around the pipe. Of the three lugs, one was positioned near one end, another near the other end, and the third at the middle. Circumferentially they were spaced 120 deg. apart.

The geological measures through which the holes penetrated are highly

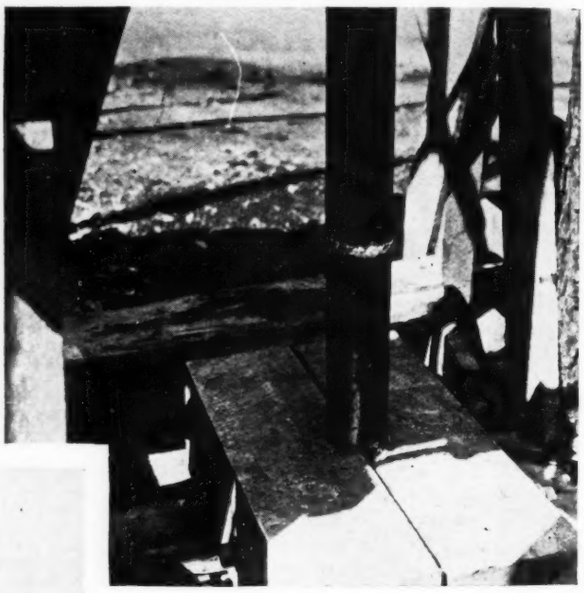
different in character—soft shale to hard sandrock and several bands of coal—and in the course of drilling, unevenness of the walls of the holes developed at numerous points throughout their lengths. Pipe-joint welds protruding about $\frac{3}{8}$ in. beyond the outer surface of the casing served with the aforementioned lugs to prevent moving or creeping of the casing after the cement hardened.

In one of the 6-in. boreholes a cable carrying 2,300 volts is installed. It is a standard lead-sheathed and wire-armored borehole cable insulated for 6,000 volts and made by the General Electric Co. Weight is taken by the armor wires and they are attached to the top structure by being wrapped individually around a plate ring or large washer and clamped tightly to it by two additional rings, one above and one below.

Two single-conductor 1,000,000-circ.mil cables are being installed in the other 6-in. borehole. These cables will feed 275-volt d.c. power into the mine from a surface substation. The negative is bare and the positive is rubber-covered.

Credit is given to P. R. Eryich, chief engineer, who located the boreholes and supervised the work.

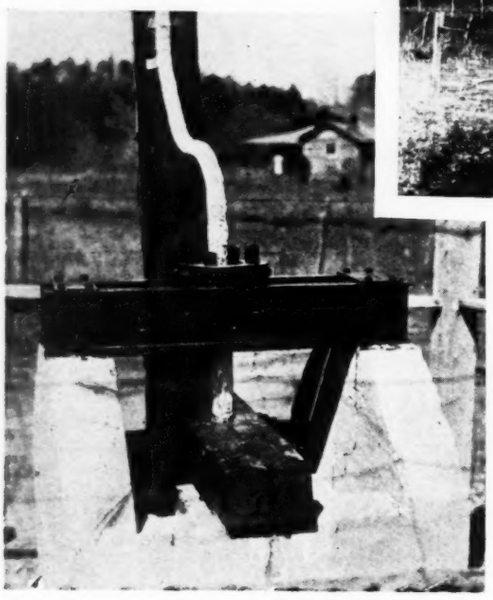
Above—All joints were made with an acetylene torch, using bronze rod.



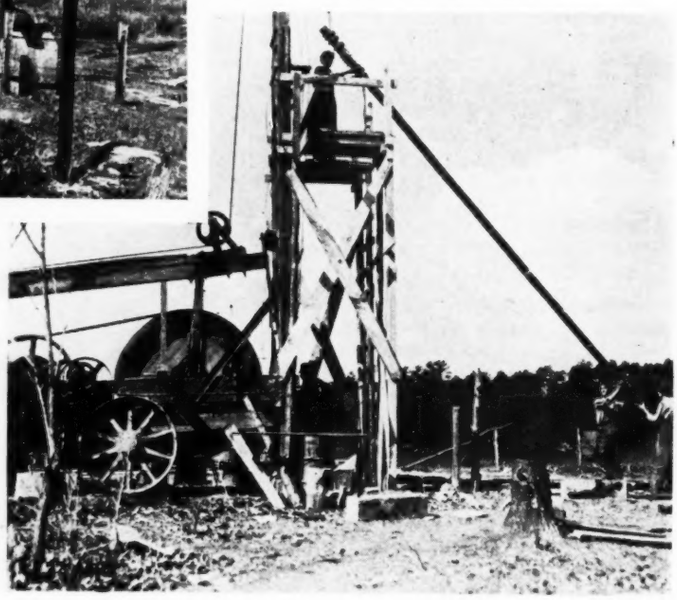
Above—Wood clamps are loosened and casing is eased 32 ft. farther into hole.

Left—The new boreholes for power cables: a.c. at 2,300 volts will enter rear hole and two 1,000,000-circ.mil d.c. cable go in other.

Below—Insulated for 6,000 volts and suspended by the wire armor.



Below—A section made by welding two 16-ft. lengths is being uprighted for welding to the section already in hole.



REFLECTOR UNITS

+ Safeguard Coal-Mining Operations With a Minimum of Expense

By K. N. BANTHIN
Oak Park, Ill.

• Reflector-button signals provide an effective and efficient safety marker for coal-mine operations with a low initial cost and a negligible maintenance factor. Reflector signals can be used in coal-mining operations to an efficiency in excess of that realized on the nation's highways.

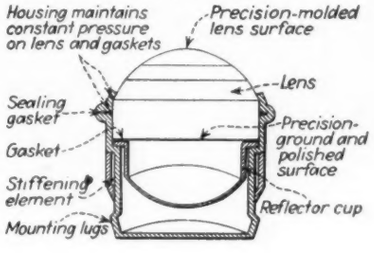
EACH NIGHT, as darkness blankets the nation's highways, millions of reflector units safeguard the motorist. By various arrangements and the use of several colors, the automobile driver instantly is warned of hazards such as curves, bridges, narrow roads, railroad crossings, obstructions, traffic-control signals, etc. As efficient safeguards of the night-shrouded highway, reflector units should be even more valuable in the nearly perpetual darkness of coal mines, where the miner's cap lamp and the locomotive headlight, as compared with auto headlights on the highway, are available for lighting them up so that they can be seen. On this theory, the author, in the course of the last two years, conducted an investigation into the characteristics and adaptability of reflector signals to coal-mining work in a longwall operation in northern Illinois.

Types of Reflector Units—A reflector unit is a reflex optical device. As applied to highway signals, the unit reflects light back to the eyes of the driver when exposed to the headlamps of an automobile approaching either head-on or from an angle. Available reflector units are of two common types: (1) flat and (2) button.

The flat unit consists of a molded common glass lens from 2 in. to 4 in. in diameter and $\frac{1}{8}$ in. to $\frac{1}{2}$ in. in thickness together with a reflecting surface. The lens usually is mounted in a non-ferrous stamped metal holder, the inner surface of which also acts as the reflecting surface. These units are of low reflective power, the reflecting surface is subject to rapid deterioration, there is a large loss of light by dispersion, and the units are not uniform in character. They are not optically or physically suitable for long-term satisfactory performance under conditions encountered in coal mines.

The button unit, in most cases, consists of an optical assembly including a precision-ground and polished lens together with a highly polished reflector cup. The plano-convex lenses are of optical glass and usually are molded by a process that allows all slumpage in cooling to be taken up in the rear of the lens, which is later ground away to close tolerances and a precision finish. This precision grinding and polishing eliminates irregular surfaces resulting from contraction in cooling, avoids loss of light by dispersion, insures accurate focus of the reflector cup and permits the production of uniform reflector buttons. The polished lens and reflector cup are mounted in a drawn-metal housing which is provided with mounting flanges in the front and back with projecting lugs to which a variety of holders for different mountings may be attached. Representative mountings are shown in Figs. 1 and 2

Fig. 1—Cross section of one type of reflector button.



The housing noted above is drawn from either brass, aluminum or zinc alloy and the entire assembly is sealed against moisture, air, gases and dirt. The sealing gaskets are of such composition that they do not lose their resiliency in cold weather or flow when hot. All the elements of the reflector button usually are, with respect to each other, as nearly electro-chemically neutral as possible. In an actual test of a group of reflector buttons in a damp escapeway entry, no outward signs of deterioration were noted in a 19-month period. Upon disassembly of four button units, their reflectors were found to be bright and shiny, proving that the gaskets were effectively sealing the units. Button units are obtainable in five sizes with diameters ranging from about 1 in. down to close to $\frac{1}{2}$ in.

Function of Reflector Units—The majority of reflector-unit highway signs are placed beyond the range of the direct, or main, beams from the headlamps of the approaching automobile. Therefore, reflector-button units are constructed to function efficiently when exposed to the secondary beams of light. The majority are made so that they will reflect back when approached by a light from any angle out to 30 deg. from head-on, or within a total angle of 60 deg. Space limitations of coal-mine operations limit the ap-

proach of any light to a group of reflectors to about 10 to 15 deg. from head-on, or a total angle of 20 to 30 deg. A group of 1-in.-size reflector buttons mounted on 1½-in. centers in an equilateral triangle, as shown in Fig. 3, were constructed with various-colored reflector buttons and illuminated with various sources of light within an angle of 15 deg. from head-on. Experimental trials on a main haulageway with the average quantity of dust encountered during haulage cycles showed that, depending on button color and type of light, the reflector signal was visible at distances ranging from 75 to 750 ft., as set forth below:

Illuminated by	Color of Buttons	Distance Visible in Feet
Edison electric cap lamp; regular style	Crystal or amber	350
	Green	300
	Red	225
Edison electric cap lamp; motor-driver's spot	Crystal or amber	750
	Green	500
	Red	325
Locomotive headlamp; 5″ reflector, 21 c.p. bulb	Crystal and amber	650
	Green	450
	Red	275
Carbide hand lamp; 4″ reflector, fair condition	Crystal or amber	300
	Green	225
	Red	175
Carbide cap lamp; 3″ reflector, new	Crystal or amber	225
	Green	175
	Red	150
Carbide cap lamp; 3″ reflector, used	Crystal or amber	175
	Green	100
	Red	75

From these distance readings, it is readily apparent that crystal and amber reflector buttons can be seen at greater distances than either red or green buttons.

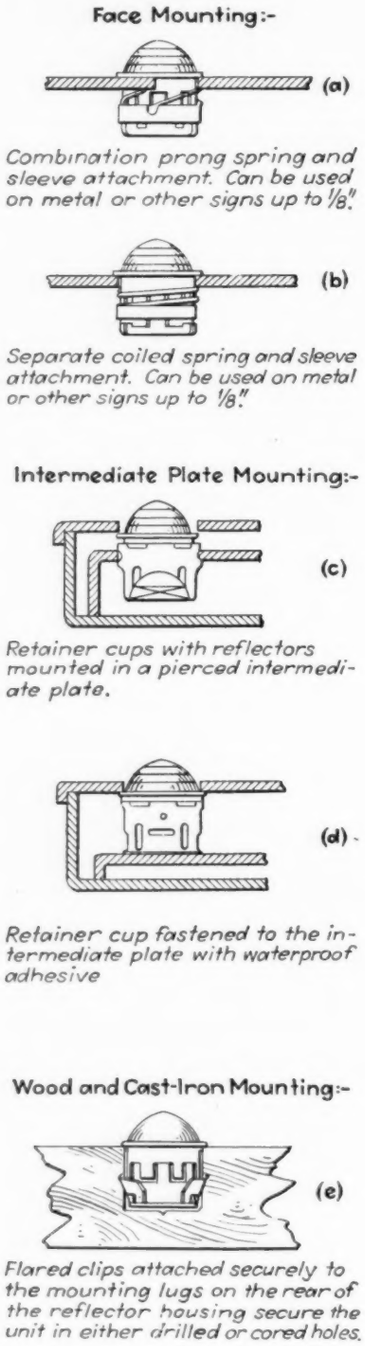
Applicability to Mining Operations—Reflector buttons may be mounted by various methods in either sheet metal, steel bars, wood, timber or cast iron. In the construction of small portable or permanent reflector signals the sheet-metal-mounting types (*a* and *b*, Fig. 2) are the most satisfactory. These can be used on metal signs or plywood up to ⅛ in. in thickness. The type *a* unit usually is assembled with a special tool and the type *b* by hand. For the construction of signs with these units it is necessary only to have the holes in the plate drilled or punched to the proper size and spaced at the necessary center distance between units. The intermediate-plate-type mountings (*c* and *d*, Fig. 2) are more permanent and less liable to theft of the units, but do necessitate a higher cost of construction, which is warranted in some cases. The wood and cast-iron type (*a*, Fig. 2) is equally suitable for any sign and has the added feature that units can be mounted directly into existing timbers, concrete walls, brick overcast structures, steel sections, etc.

For portable and semi-permanent reflector signals the three-button cluster shown in Fig. 3 was found to be the most effective. It can be readily mounted on timbers or on wood plugs driven into the rib or top, or can be hooked into machinery and other equipment. On the other hand, the three-button assembly shown in Fig. 4 was found effective for driving into the bottom. Experimental work was conducted with the Fig. 4 assembly made up with one to six buttons. Less than three reflector buttons per assembly materially decreased effectiveness but any excess over three buttons per assembly offered no marked increase. This assembly was constructed from a section of old mine-car axle, a product that usually can be found around any mine. A small quantity of roofing cement was placed in each hole prior to inserting the reflector buttons to act as a cushion and also hold the units in place when driving the point into the bottom.

Usages in Mining Operations—The Fig. 3 assembly was found effective for the following:

1. Temporary marking of broken or low headers on main haulageways or entries.
2. Temporary or permanent marking of low places caused by squeezes.
3. Marking of trackside timbers, rails or other items in storage, allowing only the minimum of clearance for motors or men.
4. Marking location of safety pockets on main or panel haulageways.
5. Marking location of circuit breakers

Fig. 2—Methods of mounting reflector units.


Face Mounting:-
(a)
Combination prong spring and sleeve attachment. Can be used on metal or other signs up to ⅛".
(b)
Separate coiled spring and sleeve attachment. Can be used on metal or other signs up to ⅛".
Intermediate Plate Mounting:-
(c)
Retainer cups with reflectors mounted in a pierced intermediate plate.
(d)
Retainer cup fastened to the intermediate plate with waterproof adhesive
Wood and Cast-Iron Mounting:-
(e)
Flared clips attached securely to the mounting lugs on the rear of the reflector housing secure the unit in either drilled or cored holes.

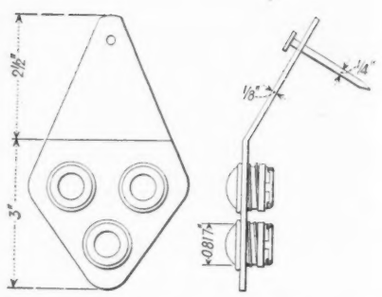
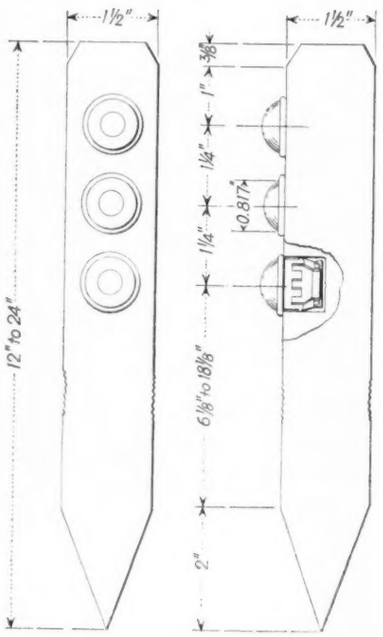


Fig. 3—Three-button cluster for temporary service.

Fig. 4—Stake type assembly to be driven into bottom, coal timbers, etc.



and switches on electrical sectionalizing equipment.
6. Marking location of cutting-machine-power take-off points on trolley wires or feeders.
7. Marking location of undercast.
8. Marking location of air, water and fire-protection valves.

The Fig. 4 assembly was found effective for the following:

1. Marking sprag or slide points.
2. Bringing to attention swags that necessitate special control or handling of haulage motors.
3. Marking location of track switch handles.
4. Marking approach of track control devices for operation of automatic ventilation doors.
5. Marking location of buried junction boxes on feeder cables in electrical service.
6. Marking location of buried control boxes for valves.
7. Marking location of undercast.

The use of signs consisting of spelled-out words was found effective in presenting various messages. This type of sign is best constructed with the smaller size reflector button units. Such signs are used as:

SLOW CURVE (for curves necessitating special speed reductions).
ESCAPE SHAFT (direction to escape shaft).
HOISTING SHAFT (direction to hoisting shaft).
FIRST-AID BOX (location of first aid supplies).
LET'S ALL BE SAFE; YOU ARE CRIPPLED FOR A LONG TIME—DO IT SAFELY; THINK SAFETY (or any other general safety sign or warning).

Further diversification was accomplished by the use of different colors. In fact, standards were set up as follows:

White and amber—Location of all operating devices, spragging points, slide points and automatic door openers.
Green—Location of all safety pockets, safety equipment, safety disconnects and fire valves.
Red—Location of all places, squeezes, broken headers, minimum-clearance zones, speed-reduction points and curves.

Cost of Construction and Maintenance—Reflector units are not costly items and can be re-used from one sign to the other at the will of the management. The 1-in.-diameter unit can be purchased in lots from 50 to 100 units in any type of mounting for about 8c. per unit (crystal and amber) or 9½c. per unit (red and green). Larger quantities are proportionately lower. The signs can be constructed with the usual mine-shop equipment and personnel. Figs. 3 and 4 assemblies will cost about 40c. each. For most effective use of reflector buttons in spelled-out signs the units should be spaced in accordance with the manufacturer's recommendations. The smaller size, about ½ in. in diameter, will be suitable for the majority of signs.

STORAGE CONVEYORS

+ And a Traveling Coal Crusher

Feature Brilliant Preparation Plant

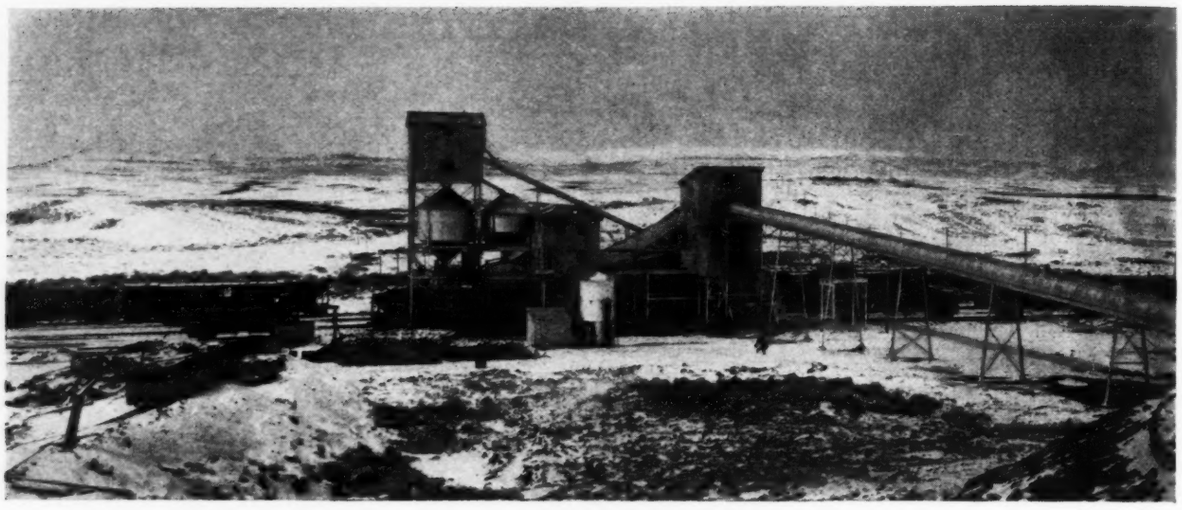
By **GLENN E. SORENSON**
General Superintendent
Kemmerer Coal Co.

and **IVAN A. GIVEN**
Associate Editor, Coal Age

Featured by storage conveyors for use while changing box cars, complete mixing facilities, a crusher mounted on trucks to permit moving it from one crushing point to another, chain-mat rescreening conveyors, tramp-iron-removal equipment for the finer sizes, a complete rescreening plant and oil treatment of all but the largest products, the tipple at the new No. 8 "Brilliant" mine of the Kemmerer Coal Co., 15 miles south of Kemmerer, Wyo., is designed both to meet the exacting requirements of present-day markets and also operate with a minimum of lost time two shifts each working day.

NO. 8 MINE was opened in the late summer of 1937, at which time the preparation plant, designed and built by the Jeffrey Manufacturing Co. in consultation with the coal-company management, went into service. Capacity of the Brilliant plant is 225 tons per hour. It prepares coal from the No. 1 Vein of the Frontier series, which has a dip of 23 deg. and a total thickness ranging from 14 to 20 ft. Aside from one persistent parting, which is eliminated in the mine by proper adjustment of the operating procedure (June *Coal Age*, p. 51), the coal is clean except for occasional bands varying in thickness and position. As much of this material as is possible is thrown out in the mine, with the picking tables in the preparation plant taking care of the remainder. The coal is bituminous in rank and, according to the medium used to break it down, runs approximately 40 or 52 per cent 3-in. lump.

Although some of the mine product goes to railroads and industrial plants, the greater part of the output is domestic in character, including a growing percentage of stoker. Inasmuch as the premium, or prepared, sizes usually are shipped in box cars, it is imperative that these sizes be handled, screened, picked and otherwise prepared with a minimum of breakage and that the degradation resulting from such breakage be removed before the sizes are fed into the box-car loaders. The first step in the prevention of breakage was in the design of the rotary dump which unloads the mine cars. A shield plate on the unloading side is extended to near contact with the dump hopper so that it retains the coal until the car has been turned practically 90 deg. This slows down



Brilliant preparation plant. The shaker screens are in the structure at the extreme right, with the mixing conveyor in the center and the rescreening plant and bins at the left.

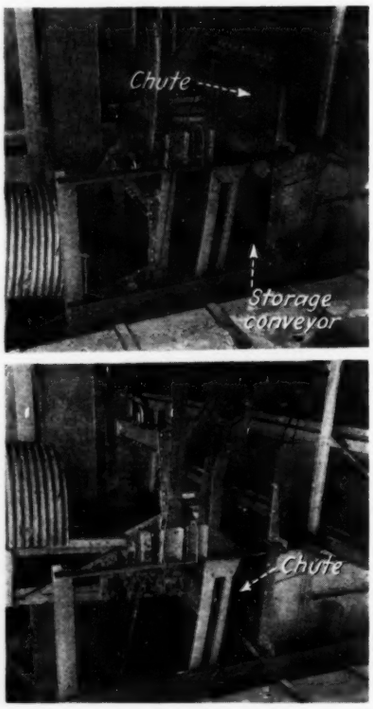
the dumping action, preventing excessive "throw" and vertical drop of the larger lumps. A set of grizzlies is installed directly beneath the curved shield plate to allow the fine coal to fall through into the hopper, where it cushions the coarse sizes.

Can Crush All Mine-Run

Capacity of the dump hopper is 15 tons. A plate feeder moves the coal out onto a 395-ft.-long belt conveyor (48-in.-wide Goodrich belt), which discharges through a chute onto the primary sizing screens. A gate in this chute, however, permits running the entire mine-run output directly into a crusher which can be set to break the feed, containing lumps as large as 24 in. in one direction, to minus 8- to 6-in. coal. The crushed coal is discharged directly into the car on the track below. The same crusher, as will be detailed below, can be moved to another location to break down the screened sizes larger than $1\frac{5}{8}$ in.

The primary screens separate the mine-run into 8-in. "fancy" lump, 8x3-in. stove, 3x$1\frac{5}{8}$-in. nut and $1\frac{5}{8}$-in. slack. The latter size normally goes via the slack conveyor to the rescreening plant (see below), but by means of a bypass gate and a bifurcated chute with flop gate it can be run to a car or into the mixing conveyor. The leg of the chute leading to the cars is equipped with oiling sprays. In connection with the handling and subsequent preparation of the slack, it might be pointed out that a magnet is installed in the chute from the primary screen to the slack conveyor to remove stray iron so that the coal is free of this material during subsequent loading, or screening and loading, operations.

Lump, stove and nut are discharged onto the picking sections of the apron-type picking table-loading booms. Up to this point, incidentally, the coal has moved from the mine cars to the tables without a single right-angle change in direction of flow—another aid in the prevention of degradation. By blanking off the proper screen sections, it also is possible to make a 3-in. "standard" lump, a $1\frac{5}{8}$-in. lump or an 8x$1\frac{5}{8}$-in. grate size, each of which is discharged onto the proper tables for picking and subsequent loading.



Two stages in changing from box-car loader to storage conveyor. Above, the boom is in position to feed the chain-mat cross conveyor; below, the boom has been raised and the automatic chute has dropped into position to bypass the coal to the storage conveyor.

Loading booms in the Brilliant tipple are not set over the center of the tracks, as usually is the case. Instead, they are offset about 8 ft., inasmuch as prepared sizes, as noted above, usually are shipped in box cars, and offsetting the booms facilitates this operation. However, the booms are pivoted under the main screens and are arranged so that they can be raised to clear the chutes into the mixing conveyor and then swung over to bring the discharge ends of the booms over the track centers for loading hopper cars.

Box Cars for Large Sizes

Lump, stove, nut and all other prepared sizes larger than $1\frac{5}{8}$ in. are loaded into closed box cars by three Ottumwa scraper-line box-car loaders with 16-ft. booms. Two of the loaders are of the MDL type, while the third is a heavy-duty unit. The cross conveyors from the loading booms to the box-car loaders are of the retractible chain-mat type: i.e., the conveying part is a continuous metal belt made up of cast-malleable links, each link having in it an opening approximately 1 in. square, and the conveyors can be shuttled back and forth to move them into or out of loading position. This construction provides an efficient rescreening action for the final removal of degradation from the plus $1\frac{5}{8}$-in. sizes and at the same time the coal is carried without sliding or grating on the conveyor. Degradation falls through the top strand of the chain mat and is picked up by the in-

closed bottom strand for discharge at the rear end of the conveyor into a small elevator. This elevator feeds the degradation onto the mixing conveyor for recirculation by means of a recirculating conveyor to the primary sizing screens and from there into the slack conveyor. If the mixing conveyor is not being operated to feed the prepared sizes to the crusher, the top strand is used as a storage for degradation, the conveyor being inched along from time to time until it is full or the crusher goes into operation. This method of degradation-disposal was suggested by the Kemmerer operating department and worked out in detail by the manufacturer. It has proved very satisfactory in eliminating the handling of spillage around box-car loaders and conveyors, formerly removed by hand.

Cut Car-Change Delays

Storage conveyors for use while changing cars are an important part of the Brilliant preparation plant. Without them, delays while changing cars would aggregate a considerable percentage of the day's operating time, particularly in the winter months, when cars are hard to move. All the tipple equipment would have to be stopped and started with each car change. With the short workday, this would result in losses in several directions, including the following:

(1) For a plant loading 1,000 tons per day, sufficient manpower would have to be available for a plant rated at 1,200 tons or more, consequently increasing the tipple force.

(2) Stopping and starting equipment increases power consumption and results in more frequent peaks, each of which adds to power cost.

(3) Intermittent operation of equipment over long periods results in higher maintenance costs than continuous running.

The storage units consist of apron conveyors which in effect form horizontal extensions of the loading booms, although they are separated from the boom ends by the chain-mat cross conveyors. To bring a storage conveyor into service, the operator, after loading a box car, raises the loading boom, at the same time maintaining the electrical interlocks provided. Raising the boom automatically causes a chute to drop down into position, bridging the mat conveyor and carrying the coal over onto the storage unit.

Conveyors Store Coal

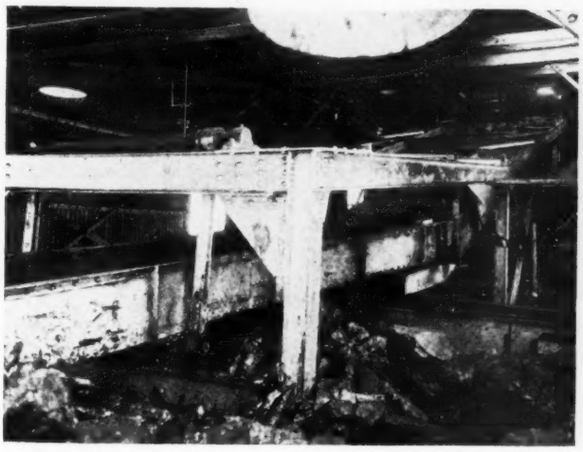
Storage conveyors are driven by two-speed motors. During the storing period, the conveyors travel at the rate of 5 f.p.m. and accommodate a maximum of five tons of coal in a length of approximately 30 ft. This provides about six minutes for a car change and permits the tipple to continue in operation. When the empty box car has been spotted and the chain-mat conveyor and box-car loader repositioned, the operator, maintaining the electrical interlocks, lowers the boom, which automatically raises the bridging chute and allows the boom to discharge onto the cross conveyor. The storage conveyor then is reversed to feed the stored coal onto the chain-mat conveyor at the rate of 2 f.p.m. In the event of a delay in excess of six minutes, with resultant loading of the storage conveyor to capacity, the storage unit will stop automatically and, through the electrical interlocks, will shut down the entire plant, thereby preventing a flood of coal at any point.

The Brilliant mixing conveyor is installed at the ends of the loading booms, which can be raised to discharge into either the top or the bottom strand through chutes which automatically come out into position. In addition to the prepared sizes, the mixing conveyor also receives straight slack from the slack conveyor (top strand) and any or all of the sizes made in the rescreening plant, which are returned on the bottom strand of the slack conveyor. The mixing conveyor also may be used to carry coal (any size from $1\frac{5}{8}$ in. up to 8 in.) to the house-coal chute, as well as for transporting, on the top strand, any one or all sizes from the loading booms to a crusher, this in addition to its task of returning degradation from the prepared sizes to the recirculating conveyor.

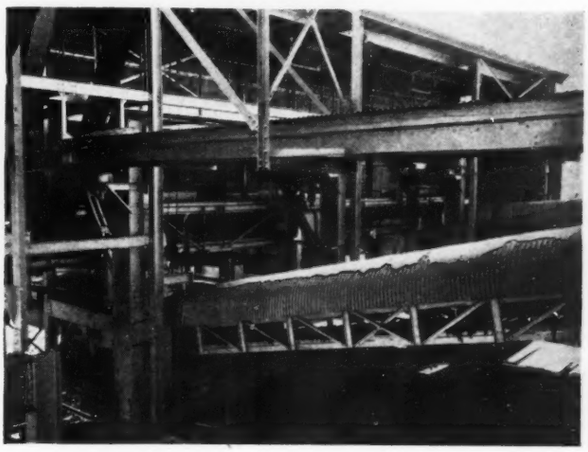
Coal Crusher Travels

In accordance with the trend in the industry, it quite frequently is necessary to break down the larger lumps in commercial mine-run to a definite upper limit. Also, considerable coal is crushed for domestic use. At the Brilliant plant, this led to the problem of determining whether to screen, crush and remix the lump or size the mine-run with a separate crusher. The answer was found in mounting the crusher hereinbefore referred to on a self-propelling truck, which would permit moving it over a track from a point under the mine-run chute to the primary sizing screens in the main tipple over into the mixing-conveyor gallery for breaking down any size brought to it on the top strand of the conveyor in question. In breaking down mine-run, one set of segments is employed to reduce the lumps to a maximum of 8 to 6 in. in size. A second set of segments is

Main screen and picking tables in the No. 8 Brilliant preparation plant.



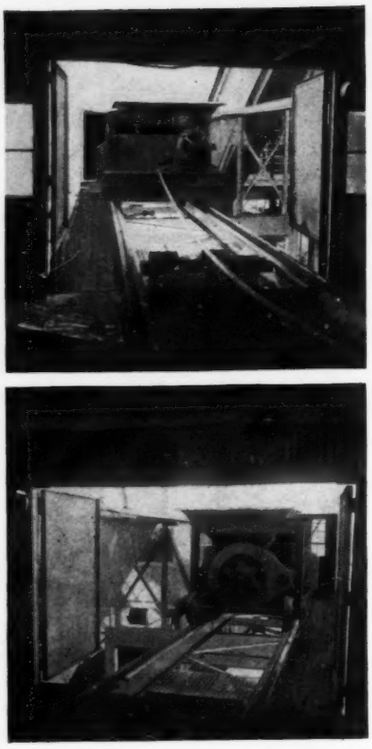
Looking across the loading booms at the mixing conveyor on the left.



installed in crushing prepared sizes received from the mixing conveyor, which are discharged into the recirculating conveyor for return to the main screen.

The crusher is a 36x36 single-roll Jeffrey unit, which naturally is adjustable to break to a wide range of top sizes. The propelling gear on the truck is operated by a roller chain taken from a sprocket on the roll shaft. Power to operate the crusher motor is supplied by means of a heavy rubber-covered trailing cable, which passes around a sheave to a weight operating in guides, thus assuring that the cable is taken in or reeled out, as required, as the crusher moves from one place to another. The installation has made it possible to size mine-run directly from the belt and thus avoid running the entire tipple while adjusting the top size of this coal.

The rescreening plant at Brilliant mine, as now constituted, can prepare and load 1⅝x1-, 1x0-, 1x3/16- and minus 3/16-in. sizes. Slack brought in from the primary sizing screens on the top strand of the slack conveyor is discharged onto a 4x8-ft. single-deck Jeffrey-Traylor vibrating screen with a capacity of 80 tons per hour, which splits the slack into 1⅝x 1- and 1x0-in. sizes. The 1⅝x1 in. pea goes into a 65-ton storage bin, from which it is withdrawn for loading over a 2½x6-ft. shaking degradation screen. Minus 1-in. material through this screen is carried by a small screw conveyor to the mixing conveyor, upon which it is transported to the recirculating conveyor.

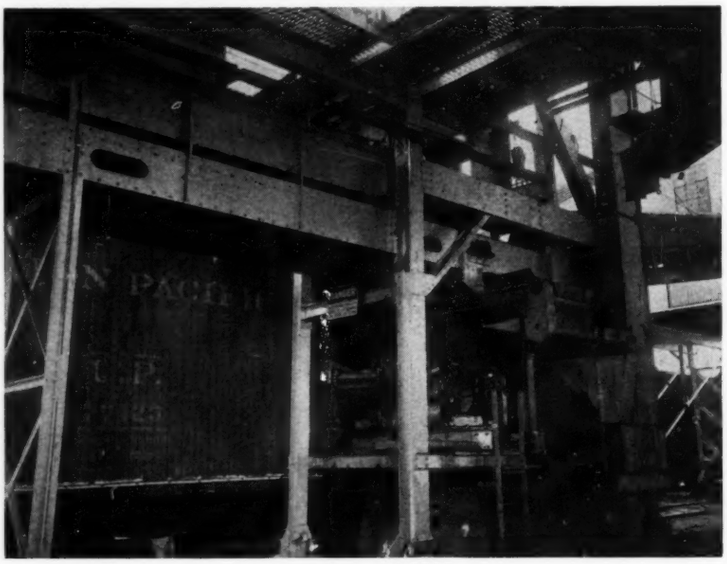


A traveling coal crusher. In the top view is shown the trailing cable which supplies power. The lower view shows how the trucks are driven off the roll shaft by a roller chain.

The 1x0-in. slack made on the Traylor screen falls into a 100-ton storage bin, from which it can be loaded directly. An auxiliary chute has been installed on this bin, however, which permits running the 1x0-in. size over a 4x8-ft. Allis-Chalmers "Aero-Vibe" screen for the production of dedusted stoker coal. Dedusting is done at 3/16 in., the 1x3/16-in. stoker going to a second track, while the dust falls into a car directly below the screen.

Plans now are under consideration for the installation of additional bins and screening equipment for the production of stoker coal, which has shown a steady increase in consumer acceptance. As noted above, either the 1⅝x1-in. pea or the 1x0-in. slack, or both, may be returned to the mixing conveyor on the lower strand of the slack conveyor for combination with the larger sizes. Tramp iron, as stated, is removed from the slack as it comes off the primary sizing screens and before it gets to the bypass point or the rescreening plant.

The Viking system has been installed for spraying 3x1⅝-in. nut, 1⅝-in. slack, 1⅝x1-in. pea, 1x0-in. slack and 1x3/16-in. stoker. Nut is treated on the end of the loading boom, while the other sizes are treated by means of sprays in the loading chutes. The dustproofing oil used at Brilliant is a 200-sec. petroleum product with a flash point of 350 deg. F. and a gravity of 1.22. Treating is done on the basis of the appearance of the finished product, and the average quantity applied, subject to variations as necessary, is as follows: nut, approximately 3 qt. per ton; slack sizes, about 5 to 6 qt.



Showing loading boom coming down to chain-mat cross conveyor feeding box-car loader. Above the loader and extending to the left is the storage conveyor used when changing cars.

[SECOND OF THREE ARTICLES ON STEEL SUPPORTS IN MINES]

STEEL SUPPORTS AND STRAPS

+ Displace Wood Posts and Crossbars

By DR. R. G. WUERKER
Consulting Engineer
Manila, P. I.

• "Use once and then discard" has been too long the American motto. Though this has been regretted with regard to untreated woods, ties and timbers, it is an equally unfortunate motto in regard to props. Steel props can be used again and again and they can be designed to suit roof conditions. Yielding steel posts are needed where backfilling is used; more rigid posts where the coal is not replaced by waste. A yielding post allows weight to fall on the coal face. With standard steel props of certain design, the yield of the prop to pressure can be regulated to meet the requirements dictated by the nature of roof and the method of working.

STEEL mine props have had as wide a spread in the coal mines of Europe as have the steel supports for roadway timbering described in my article in the August issue. Working methods in the United States are quite different from those across the Atlantic, for there coal is removed mainly by longwall methods with backfilling or controlled caving. Usually, also the rock pressures are so heavy that mining men in America would find it difficult to conceive them.

Steel mine props, especially as used in British mines, have often been described in the pages of *Coal Age*. However, in Great Britain the caving method is used almost exclusively. Therefore only rigid or very slightly yielding steel posts are needed at the face. On the Continent of Europe, on the other hand, backfilling is used as well as the caving method and therefore both yielding and rigid props are needed. Thus the construction of steel props in German coal mines and experience in their use may contribute to a more complete exemplification of the subject.

Steel Props Displace Wood

It was shortly after 1900 that the first tests were made with steel props, after which many designs were evolved and equipment was constructed, but the props did not remain long in use. However, during the World War the timber scarcity was so acute and the need for steel mine props became so urgent that new designs were introduced. Among the many now available are the Schwarz[1] (Fig. 1) and the Toussaint-Heintzmann (Fig. 2). Some collieries now use steel props exclusively in all faces. Steel crossbars and straps also are used.

Though this second period of experience has extended over twenty years, development in the construction of steel props has not come to an end, and this because working methods have changed. Before the War, in longwall mines, mine officials wanted a roof to overhang a considerable distance, to settle gradually and to help break the face down. This method required steel props of yielding type. It also, however, needed backfilling, but, because of an increasing shortage in such material, mine officials in Germany were compelled to resort to the caving system. With this method, the roof breaks clean at a moderate distance from the face. Between these two extremes, every intermediate working condition prevails.

Thus, the requirements for roof control vary from the support of a weak drawslate roof to that of a more self-sustaining hanging wall. Hence, steel mine props range from yielding to rigid types, but the exclusively rigid prop has never been successful in Continental coal mines, though in England 95 per cent of all pit props are of this type.

German steel props rely on friction and on the compression of small wooden parts for their effective operation. The inner parts of both the Schwarz and Toussaint-Heintzmann props are tapered and a second or third wedge is inserted in a wedge box on the top of the lower part of the props. The third wedge can be replaced by a wood board, should one be needed to develop in the prop the maximum resistance to shortening. Moreover, by changing the taper of the wedge or the kind of wood in the board, the action of the prop can be regulated to produce the desired result.

Relate Load to Yield

Diagrams have been constructed showing the relation between load and yield. The load-yield curves of most of the British props and of some of those used on the Continent are shown the publication "Steel Pit Props" of the (British) Safety in Mines Research Board (February, 1931, p. 82).

Typical curves of Schwarz and Toussaint-Heintzmann props are given in Fig. 3. Curves 1, 2, 4 and 5 represent the action of props of the more rigid type, which are preferred for all such longwall faces as are operated by the caving system; curves 3 and 6 are those of the more yielding old-time props as used for such longwall faces as are backfilled. Curve 7 shows the shortening of a pinewood chock under load.

[1] *Der Bergbau*, Feb. 14, 1935, p. 45; April 25, 1935, p. 127.

Differences in the resistances of props are effected by changes in the position of the wedge or by the insertion of a board, wh'ch may be thick or thin, readily or less readily compressible. It is found that the subsidence of the roof definitely can be planned on the basis of the load-yield curve of the props provided.

The ultimate strength of the heavy types of German steel mine props is considerable, as Fig. 3 demonstrates.

Fig. 1—Old type Schwarz steel props with steel crossbars and corrugated straps at a longwall face. On the left the roof broke clean but is held up by the props.

Courtesy Beratungsstelle fur Stahlverwendung, Dusseldorf, Germany

Fig. 2—Withdrawing a Toussaint-Heintzmann steel prop from a safe distance.

Courtesy Beratungsstelle fur Stahlverwendung, Dusseldorf, Germany

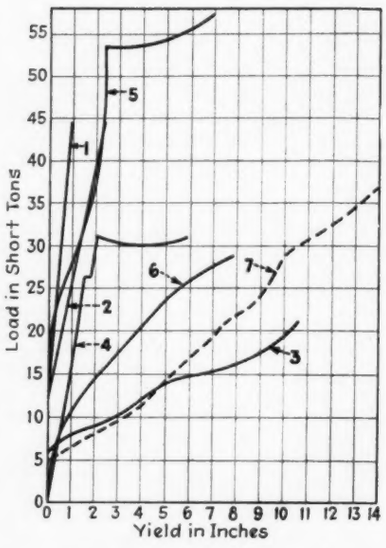


Fig. 3—Load-yield curves of German steel mine props.

1—New Schwarz prop with steel wedge; 2—same prop with steel wedge and wood board; 3—old Schwarz prop with wood wedge; 4—Toussaint-Heintzmann prop with wood crusher block; 5—heavy Toussaint-Heintzmann prop with lifted sliding wedge and wood board; 6—Toussaint-Heintzmann prop with sliding wedge, not lifted; 7—compression curve of wood cog (5¾ ft. high).

Some can carry 40 to 50 tons, and occasionally props with an ultimate strength of 65 tons have been supplied. Posts of this strength lately have been used to replace cogs made of old rails, for which German mining circles have shown strong preference (Fig. 4), but use of these posts is possible only where a solid sandstone floor is present to carry the load.

To obtain a prop of such resistance, every part of the design had to be strengthened or new steel sections devised. The Schwarz prop was originally made of two adjacent standard channels. By using the special Toussaint-Heintzmann sections (*Coal Age*, August, 1939, Fig. 6e, p. 31) with about equal strength in all directions, the resistance to buckling has been greatly increased. Finally, for rigid props under heavier load also for the Schwarz prop, where such strength is desired, a section is used composed of two U-sections welded together to form a rectangle.

The dangerous section of such a steel mine prop is always in the upper part, which has the smaller cross-sectional area, and it has to be considered in calculating the ultimate buckling strength of the prop. Eventually, however, such a computation has to be made separately for each length a prop will assume under pressure.

Another important point for the

mine foreman to consider is the relative lengths of the props as extended and compressed. A prop which is 2 ft. long when fully extended will normally yield under compression 25 per cent, or 6 in. A 4-ft. prop similarly will yield 35 per cent; a 6-ft. prop, 40 per cent; and a 13-ft. prop, 45 per cent. As such steel props need not be fully extended when built in, their margin of accommodation is wide enough that the prop can be fitted to the seam thickness should it vary slightly. For a 4-ft. seam, a 5-ft. prop should be ordered because a 4-ft. prop might be too short if the seam should thicken. The Schwarz prop is lengthened by driving wedges in the several slots until the prop fits tightly. With the Heintzmann, the plunger is raised in the same way but finally fastened by a spindle.

Steel Straps and Laggings—Between props, the roof needs more support than wood crossbars can provide. Fig. 5 shows several steel straps used in lieu of wood lagging. Some are of sections newly introduced and some are only scrap products such as old mine rails. Nearly all of them require some modification to be made in the design of the head of the prop.

Economy of Steel Mine Props—In nearly every instance where a change has been made from wood to steel props, great savings were effected. Usually those savings have been expressed in the reduction of the total timbering costs. At a colliery that uses steel lagging and straps as well as props, the savings were $0.083 to $0.110 gold per ton, each figure representing an average for one year. The props, though shifted every third day, lasted six to seven years.

At another colliery the saving was $0.06 gold per ton. A cost sheet for this plant is given in the accompanying table. Notable among the costs for steel support is the expenditure for wood laggings and straps. With the cost of the wedges, they amount to more than half of the total of all steel-support costs.

Although the cost reduction is only 2 to 4 per cent of total mining costs, as the net profit in the years to which the figures refer was only about 8 per cent of the same figure, an increase of 2 per cent in the profits earnable by the use of steel props, in place of wood, cannot be ignored.

Statistics—In Germany, more than a million Schwarz props of the old type have been sold and 220,000 of the new semi-rigid and rigid type. No exact figure for the Toussaint-Heintzmann prop is available, though this number may reach into the hundreds of thousands.

According to the report of the British chief inspector of mines,[2] the number of steel mine props installed in British coal mines was 498,214 as of June 30, 1937, and in 1934 the increase, according to S. M. Dixon and H. M. Hudspeth,[3] was 100,000 annually. The tonnage of steel resulting from this substitution is about 15,000 tons for installed props and 3,000 tons for the yearly increase.

[2] Thirtieth Annual Report of H. M. Inspector of Mines, 1938, p. 187.

[3] *Colliery Guardian*, June 29, 1934, p. 1199.

Timber Cost Sheet at a German Colliery per Ton of Coal Mined

	Cost per ton, dollars, gold	Per Cent
Wood Props		
Cost of timber	0.112	89
Transport on surface	0.005	4
Transport underground	0.008	7
Total	0.125	100
Steel Props		
Costs of wood lagging and straps	0.032	49.2
Transport on surface	0.001	2.2
Transport underground	0.003	4.4
Amortization and interest on steel props	0.012	18.7
Amortization and interest on steel laggings	0.003	4.9
Repair costs, props	0.003	4.6
Repair costs, laggings	0.001	1.7
Changes in steel props	0.001	2.1
Cost of wood wedges	0.006	9.8
Cost of supervision	0.002	2.4
Total	0.064	100.0

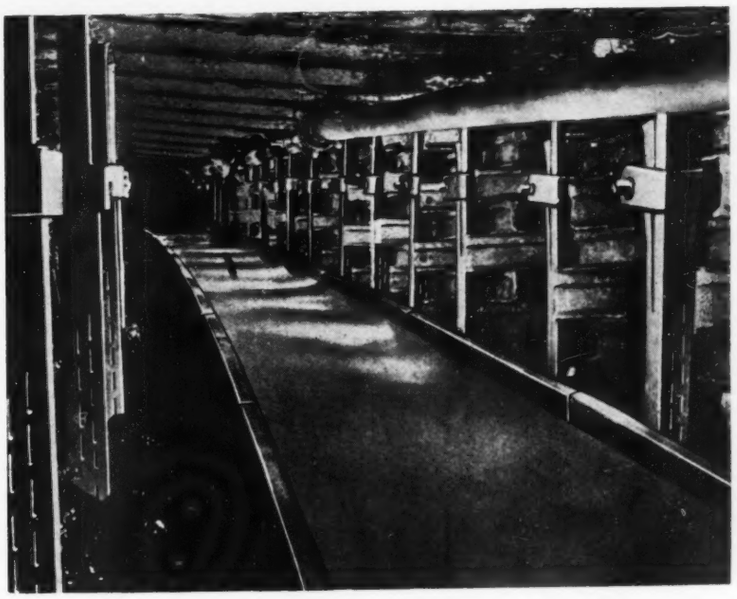


Fig. 4—New Schwarz steel props with steel cogs on right.
Courtesy Beratungsstelle fur Stahlverwendung, Dusseldorf, Germany

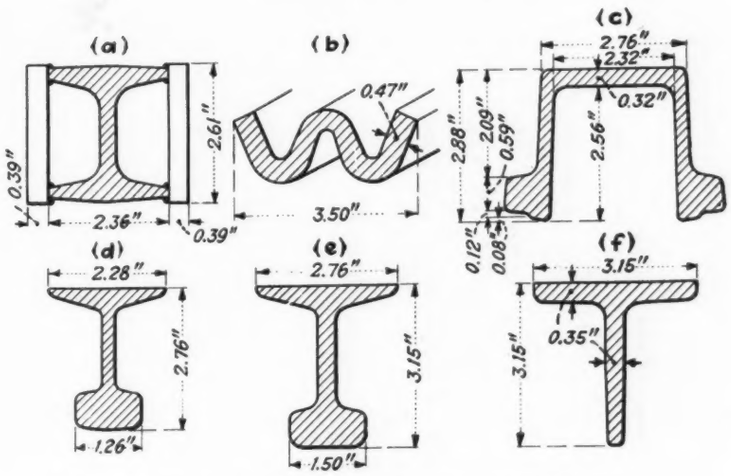


Fig. 5—Steel Laggings in German coal mines.

a—Special lagging for Toussaint-Heintzmann prop; *b*—corrugated strap; *c*—special section for Toussaint-Heintzmann prop, which is used also as crossbar; *d* and *e*—old mine rails; *f*—T-bar.

Notes . . . FROM ACROSS THE SEA

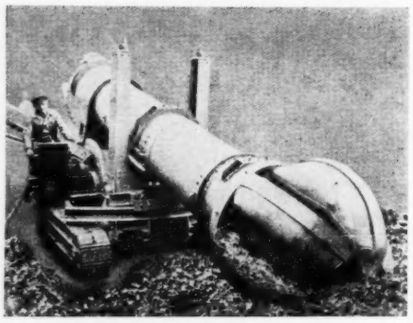
EFFORTS to reduce noise so as to enable men, if possible, to hear the roof should it crack, to converse with and warn each other, and so as to eliminate the distraction which sound produces, have been made by the Safety in Mines Research Board of Great Britain. At a sound of 90-phon intensity it is very difficult to converse, but at 60 phons, conversation is said to be conducted without discomfort. Though the noise emitted by a coal cutter under heavy load is high in the scale, it is doubtful, because of the nature of the operation, that any measure can be taken to mitigate the noise.

The noise of a haulage hoist was reduced from 100 to 90 phons by piping its exhaust air through the hoist-house walls. With cast-iron shrouded gears, the intensity was 92 phons and with cut steel gears only 71. By an internally lagged silencer into which both cylinders exhausted, the noise of a 100-hp. hoist was reduced from 98 to 70 phons. In other cases, each cylinder should have its own silencer. One large air-conveyor-drive manufacturer is incorporating lagged silencers in all its haulage hoists.

By using better couplings for shaking conveyors, the noise from conveyor pans can be reduced from 90 to 70 phons. Deficient lubrication and other defects at the driving end may raise the noise level 24 phons. Though belt conveyors normally are relatively quiet and the noise level is about 50 phons, an unlubricated roller may develop a sound of twice that intensity. A strong perforated rubber sleeve, asbestos-lined, clipped around the barrel of a hand percussive air pick, will reduce the noise emission from 88 to 74 phons (measured 51 ft. from the source). The moisture in the air does not freeze as a result of the application of the sleeve nor is there an ascertainable back pressure to reduce the efficiency of the tool.

DYNAMOMETRIC tests of the Safety in Mines Research Board of Great Britain have shown that a trip of cars with rigid drawbars, to start which required 10,000-lb. tension, needed only about 3,000-lb. tension to set them in motion when these cars were equipped with spring draft gear, a saving of 70 per cent.

A QUITE unusual form of excavator made by Bleichert Mitchell, of London, England, is illustrated herewith. As the shovel revolves, the material—coal, sand, gravel or other — is lifted and passed through a slot to a belt conveyor which is incorporated in a large boom of circular cross-section. Thence it can be conveyed direct into mine cars or by means of a small swiveling belt conveyor or portable belt conveyors into automotive trucks, railroad hoppers or dump cars. The shovel runs on caterpillars, each



By revolution of the head, material is deposited on a belt and carried back to the loading point.

driven by its own motor; separate motors are used for the operation of the shovel, belt conveyor and swiveling and vertical movements of the boom. Material from a largish area can be removed without shifting the entire machine and the former can be attacked from the top, letting the shovel gradually work downward, which is an advantage where the material to be loaded is of a sticky nature.

INTEREST seems to be rife in regard to the sulphur compounds in coal and as to the means by which the sulphur can be made during combustion to combine with other elements which will hold it in the ash and thus out of the atmosphere. Comparison of the percentages of "total" and "combustible" sulphur in coal as determined by laboratory tests would suggest, declared Dr. G. W. Himus and Prof. A. C. Egerton, addressing the Combustion Appliance Makers' Association (Solid Fuel), that as a rule practically all the sulphur in British coals (other, perhaps, than the "sulphate" sulphur) would be converted by the heat of the furnace into oxides and so escape into the atmosphere.

But laboratory figures for "combustible sulphur," obtained by deducting the sulphur which the ash retains from the total sulphur, are misleading, for the coal in the laboratory is burned in a thin layer at 775 plus or minus 25 deg. C., and is exposed to so much air that the atmosphere is oxidizing. On the other hand, on a grate, coal is burned in a bed several inches thick and, accordingly, the atmosphere is reducing, not oxidizing; hence ferric oxide in the mineral matter becomes ferrous oxide and sometimes even metallic iron.

Grate bars are often attacked by sulphur, ferrous sulphide resulting; appreciable quantities of sulphides of lime, magnesia and ferrous iron may be formed by reduction of sulphates in the mineral matter and the bases may fix some of the pyritic and organic sulphur. For these reasons the actual emission of oxides of sulphur when coal is burned on grates probably would be less than would be expected from an ascertainment of what is known as the "combustible sulphur" in the coal.

During carbonization, part of the sulphur is expelled, mostly as hydrogen sulphide and, in general, to a smaller extent as organic compounds of sulphur (such as thiophenes, mercaptans and thioethers); 50 to 70 per cent remains in an altered state of combination in the coke or semi-coke. (Thiophene is $(CH)_4S$. Mercaptans are of the type RSH, and thioethers are alkyl-sulphides of the type RSR where R is a radicle such as C_2H_5 or CH_3.)

According to experiments made by V. Armstrong and quoted by Dr. Himus and Professor Egerton, the presence of hydrogen at 700 deg. C. increases the elimination of sulphur in one coal from 42.4 to 53.05 per cent and at 1,100 deg. C. from 43.8 to 80.55 per cent.

That some of the mineral matter in the coal may increase or may diminish the quantity of sulphur eliminated in coking is evidenced by the effect of adding certain chemicals to coal. Himus and Egerton quoted Priestley and Cobb to the effect that additions of sodium carbonate and sodium hydroxide aid in the elimination of sulphur from cokes made at 500 deg. C. but favor its retention in cokes made at 800 deg., whereas calcium oxide, ferric oxide and, in a lower degree, calcium carbonate, tend to a greater retention of sulphur in cokes made at 800 deg. than when coal is carbonized without these additions. The proportion of sulphur being emitted from burning coal might be reduced, therefore, if the coal before use were treated with small quantities of lime or other basic oxide.

According to K. Yamada and T. Sawamura, writing for the *Journal of the Fuel Society of Japan*, in an article recently quoted in *Fuel*, pyritic sulphur is the first to be decomposed on a rise in temperature, that decomposition occurring at 400 deg. C. Sulphate sulphur follows with a decomposition temperature between 550 and 600 deg. C., whereas organic sulphur compounds are the most stable of the three and begin to decompose between 600 and 800 deg. C. Evolution of sulphur from briquets is most rapid during the period of highest temperature rather than immediately after ignition. When slaked lime is used as a binder and ferric oxide as a catalyst, no sulphur is evolved at temperatures lower than 900 deg. C., but when the temperature is raised to 1,100 deg. C., the sulphate of lime decomposes and evolves sulphur dioxide.

Calcium carbonate, magnesia, manganese oxide, copper oxide, iron oxide, barium carbonate and sodium peroxide were not found to fix as much sulphur as slaked lime. Calcium carbonate begins to decompose at 900 deg. C., at which temperature the sulphate, if it could form, would decompose. The oxides fix the sulphur as sulphate, but the sulphate usually decomposes below 900 deg. C. Barium carbonate has such a high initial temperature of decomposition to barium oxide that the temperature of the briquet is not high enough to fix much of the sulphur. Sodium peroxide acts directly on the sulphur dioxide, forming a sulphate with a relatively high decomposition temperature, but, as the melting point of the peroxide is 884 deg. C., the melted sodium sulphate covers it and no further reaction is possible. Barium oxide with ferric oxide as

a catalyst was found to be the most suitable fixing material.

In comment it may be said that 1 lb. of the barium oxide will be needed for every 19 lb. of coal even if the latter has only 1 per cent of combustible sulphur. If the coal has more, the quantity needed will be proportional. Hence, the quantity of barium oxide would be excessive and, as the price of the material is 9 to 10c. per pound in drums, the suggestion does not seem attractive, to state the matter mildly. Certainly it would not be desirable for coal that is not to be briquetted. Doubtless, the price of barium oxide is far greater than need be if demand were greater and would be reduced if the purchaser let down the bars as to purity and favored, as he should, a high percentage of ferric iron, generally undesired by other industries, but, with all allowances, the proposition is not one to be considered.

In the July issue, p. 58, appeared a statement of differences in the manner of operation of the Hoy and Mavor & Coulson "gummers," but in citing these differences the commentator did not intend to infer that one gummer was preferable to the other.

R. Dawson Hall

On the ENGINEER'S BOOK SHELF

Requests for U. S. Bureau of Mines publications should be sent to Superintendent of Documents, Government Printing Office, Washington, D. C., accompanied by cash or money order; stamps and personal checks not accepted. Where no price is appended in the notice of a publication of the U. S. Bureau of Mines, application should be directed to that Bureau. Orders for other books and pamphlets reviewed in this department should be addressed to the individual publishers, as shown, whose name and address in each case are in the review notice.

Reclamation of Stripped Coal Land, by Albert L. Toenges, U. S. Bureau of Mines. R.I. 3440; 11 pp., mimeograph.

This "report of investigations" summarizes the availability of stripped land for agriculture, grazing, orchards, vineyards, recreational parks and pisciculture. Effects of stripping are almost always favorable but depend in a degree on the nature of the turned-up soil. Where land in Kansas before strip mining was too poor for agriculture, the spoil banks, twenty years after mining, have developed a heavy growth of grass and timber. At an abandoned Illinois strip pit, a heavy growth of sweet clover now mantles the spoil banks.

A 20-year-old stripping spoil bank in Illinois has developed a natural growth of cottonwood, oak, elm, maple and locust with some trees 12 to 24 in. through. Part of the land is leased to rod-and-gun enthusiasts. In Crawford County, Kansas, 300 acres of stripped land is now a State park with lakes stocked with fish, and roads for the public built on the ridges created by stripping. One area in southern Illinois, however, ill-suited before stripping for farm purposes, still remains of little value after stripping.

In one instance 130 acres of strip piles were leveled at a cost of $50 to $60 per acre, which is a figure above the usual value of farm land. Peaches and grapes have been grown successfully on stripped land in Crawford County, Kansas. For $10 per acre every third ridge may be leveled for a width of 15 ft. and planted with rye to keep down weeds and thus the land may be prepared for grazing. It may be best to plant one class of trees in the valleys and another on the ridges, each class chosen to suit its preference for shelter or exposure.

In 21 Indiana strip mines were planted from 1934 to 1938 inclusive 3,399,750 trees and 187½ bushels of walnuts at a total cost of $39,708.94, inclusive of labor and at a cost per acre, including walnuts, of $14.50, and per tree, including walnuts, of a little more than a cent. One-year black locust seedlings cost $1.50 per thousand. Similar seedlings and 4-year transplants of conifers cost $4 per thousand.

Loss of farm revenue due to the mining of a 5-ft. seam is shown to be such that it would require 441 years for it to equal the revenue derived from the mining of the coal. In the case of farming, this calculation is based on a corn crop and in the case of mining on railroad coal. By revenue is not meant profit but gross sale price of product. And still the land can be reclaimed.

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Necessity for More Extended Use of Safety Equipment in Mining, by D. Harrington, U. S. Bureau of Mines. I.C. 7036; 14 pp., mimeograph.

"Equipment" is used in this circular in its broadest sense, covering safety clothing and supplies and even the motion picture. The figures quoted show a big improvement in the fatality rate, but if that rate is to decline markedly, probably the greatest advance from now on will come from the combined effect of systematized timbering of a better type than is now customary, of less recklessness and of better technique rather than from safety equipment, great as is the need for the more extensive use of the latter. Perhaps, however, safety equipment is the easier approach to greater safety.

A hundred lives lost by failure to wear safety hats, if rated at $5,000 per life, including direct and indirect expense, would cost $500,000, which would buy such hats for a third of the coal miners of the United States and with the non-fatal accidents naturally accompanying such a number of fatalities would buy safety hats for half of our coal miners, declares this circular. Hence, prevention is less expensive than compensation.

"If contact electrocutions, fatalities and other accidents caused by men being 'hit' by the trolley wire and then run over by cars or locomotives, also fatalities or other injuries from explosions and fires caused by arcs and sparks from the trolley system are taken into consideration, that system is unquestionably responsible for at least 10 per cent of the fatal, and large numbers of the non-fatal, accidents that now occur in our mines," adds the author.

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Sixteenth Annual Report of the Safety in Mines Research Board, 1937. British Library of Information, New York City. 136 pp., 6x9¾ in.; paper. Price, 65c.

This publication includes a report of matters dealt with by the Health Advisory Committee. Material covered by this report will be given notice in *Notes From Across the Sea*. Report discusses safety instruction, explosions, spontaneous combustion, explosives, lighting, falls of ground, haulage, noise, protective clothing, wire ropes, mine-rescue apparatus, temperatures, silicosis, dust protection and cooperation of the Board with similar institutions in other countries.

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Lighting Practices in Coal Mines of the United States, by A. B. Hooker and C. W. Owings, U. S. Bureau of Mines. I. C. 7035; 11 pp., mimeograph.

Power flood lighting in gassy coal mines is not always feasible; it would increase hazards at the face workings at least until such time as suitable lighting fixtures and wiring could be obtained, declare the authors. However, increased illumination could be provided in every mine by using more modern designs of portable electric lamps, by maintaining lamps adequately and by using a separate light circuit to avoid the fluctuations in voltage and the hazards accompanying use of current from the customary power line, especially the trolley system. Nine States permit power lights anywhere at the State inspector's discretion and eleven make no reference to face lighting. Other forms of lighting are discussed. Specific dangers of power flood lighting at the face are not recited nor are such practices described.

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Proceedings of the Forty-First Annual Meeting (1938), American Society for Testing Materials. 1388 pp., 6x9 in.; paper. Price, $9; to members, $6.

In this voluminous book, covering almost all kinds of material, is a tentative method for sampling coals according to ash content and tentative definitions for varieties of bituminous and sub-bituminous coals. Among committee reports are tentative specifications for sieves for testing purposes (wire-cloth sieves, round-hole and square-hole screens or sieves), method of calibrating woven wire-cloth sieves, tentative revisions of standard methods of laboratory sampling and analyses of coal and coke, and tentative revision of standard method of sampling coal. Also, reports of Committee D-5 on coal and coke and of the sectional committee on the classification of coals.

Greater Stability

of Gulf quality oils

SHOWS UP in long-time service!

Slight differences in oil quality become magnified in service, having profound effect on wear of moving parts and ultimate maintenance expense!

TWO lubricants may be manufactured to look alike, and to meet the same specifications—but that's no guarantee they will perform alike! One may retain its lubricating qualities under severe temperature and load conditions, while the other may depreciate and allow friction to take a heavy toll in wear and maintenance expense.

These variables in characteristics of lubricants are being studied each day in the Gulf laboratories by a large staff of qualified technologists. Through this exhaustive research, Gulf has developed lubricants with performance qualities which can not be predicted from the usual inspection tests.

You can tell the difference when you use them! Their greater stability shows up in long-time service. Under severe operating conditions they prove their endurance and resistance to decomposition. These better oils help operating men step up production schedules, cut down costs of machine operation. Mine managers report greater productivity from their equipment after it has been checked over by an experienced Gulf lubrication engineer and his recommendations adopted for the proper application of improved lubricants.

To evaluate the importance of certain differences between lubricants, Gulf research technologists do experimental work with this sleeve bearing which has been made with a tolerance of less than 1/10,000 of an inch, and might be considered a perfect bearing. Faults in its construction have been eliminated in order that results may not be confused by secondary effects of such faults.

Every mine operating company from Maine to Texas can have the benefit of this cost-reducing lubrication service. More than 1100 Gulf warehouses in 30 states make these higher quality oils and greases quickly available to you. Write or phone your nearest distributing point today . . . Gulf Oil Corporation—Gulf Refining Company, Gulf Building, Pittsburgh, Pa.

Maintenance Costs REFLECT Oil Quality

Master Mechanic at highly mechanized mine says, "We make heavy demands on our 20-ton locomotives—so we follow the Gulf engineer's recommendations to the letter. That's one good reason why we get continuous operation from them, with low costs for maintenance!"

Superintendent of another large mine says, "Our electric locomotives pull more cars out of the mine at one haul since we standardized on Gulf Mine Car Grease. Gulf's higher quality lubricants and engineering service are helping us to keep maintenance costs down."

GULF INDUSTRIAL LUBRICATION

A COMPLETE LINE OF MORE THAN 400 OILS AND GREASES FOR INDUSTRY

OPERATING IDEAS

From

Production, Electrical and Mechanical Men

Special Truck Facilitates Moving Shovel Cable

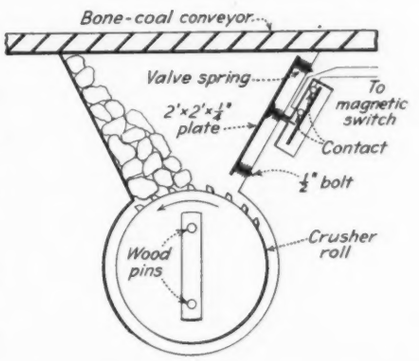
To simplify the job of moving the cable up behind the 750B electric stripping shovel at the Broken Arrow No. 4 mine of the Seneca Coal & Coke Co., Catoosa, Okla., the special truck shown in the accompanying illustration has been developed by the mine staff. As indicated, the truck consists of an old auto frame and wheels with a tongue to permit hauling with a team or a tractor. A team usually is used. On the frame, a cross member giving the effect of airplane wings is mounted. And on each wing is mounted an old auto wheel, the rim of which serves as a groove to hold the cable. As the illustration shows, the truck is kept on the bank with the cable reserve; the cable passes around one sheave, across the "wing" and around the other sheave, or auto wheel, and down to the shovel in the pit. Moving the cable merely is a matter of hitching to the truck and pulling it forward, while taking-in or paying-out cable is eased by the two sheaves.

A special cable-handling installation also is used on the loading shovel at Broken Arrow No. 4, although it should be noted that, due to a change in loading methods, the shovel is being used temporarily only as a means of handling skips and eventually will be sent to another of the Sinclair stripping operations. On this shovel a pipe with a slot all the way along it large enough to take the cable is mounted on the frame just over the cats—with the slot upward. A supplementary opening at the center permits the cable to be brought up and laid in the pipe either to the right or the left so that it comes out at one end or the other at a safe distance outside the cats. Thus, the shovel can back without having a man behind to watch out for the cable and with less danger of running over it.

Cable truck at Broken Arrow No. 4 with the stripping shovel in the background.

Limit Switch Stops Conveyor When Crusher Chokes

Bridging of coal across the crusher-feed opening, with consequent building up and damaging of the flights of the bone-coal conveyor feeding the crusher, has been eliminated at the Minnehaha preparation plant of the Hickory Grove Coal Mining Corporation, Sullivan, Ind., by installing the limit switch shown in the accompanying sketch. Details are furnished by Lyman Ellrick, chief electrician. Such bridging or choking was caused either by large pieces sticking in the feed opening or by breaking of the crusher shear pins.

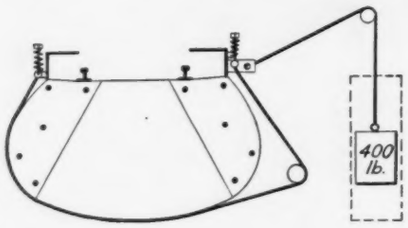


When the coal bridges over, it opens the circuit to the magnetic switch, stopping the conveyor and all other motors back to the coal feed.

Twenty-six motors operate in sequence and when any one of them stops, all units back to the feed are stopped. When the coal builds up in the crusher-feed opening it pushes the 24x24x¼-in. contact plate back about 2½ in. against the automobile valve springs, thus opening the normally closed switch and stopping all units back to the coal feed. The limit switch has been in service since about the first of March and, Mr. Ellrick states, "has paid for itself many times in savings of time, labor and repairs."

Weight on Rotary Dump Smooths Operation

To reduce the starting torque on the motor, save power and protect the gear reducers from sudden stresses, a weight has been added to a power-operated rotary dump by Van B. Stith, superintendent of mines, Anchor Coal Co., Highcoal, W. Va. Naturally, the dump is of the type which turns over and back, as a weight would



Showing diagrammatically the application of a weight to a power-operated rotary dump.

be of no value to a rotary unit which makes a complete circle in dumping. The weight itself never is at rest; the dump when righted is held in place by a brake.

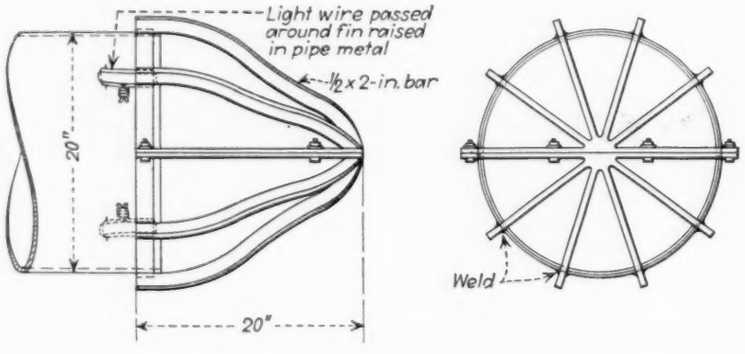
Installation of the weight, Mr. Stith states, has resulted in a 60-per-cent power saving and has cut the motor-starting current from 30 to 10 amp., with a corresponding decrease in starting torque. This and the other advantages result from the facts that (1) the weight helps start the dump, (2) as the dump goes over center, the weight starts holding it back and thereby relieves the gear reducers of the strains resulting from a sudden reversal of load and (3) the weight causes the dump to sit down easily when it returns to normal position.

Metal Tip Protects Ventilating Tube

A protective tip used over the end of metal ventilating pipes and also appearing to have application where cloth ventilating tubing is employed is described in the March, 1939, issue of *Engineering and Mining Journal*. Employed in the 11-mile Stanislaus tunnel now being driven in southern California, the tip protects the ends of tubing from damage from fragments thrown back from the face during blasting.

The tip consists of two halves each made up of five ½x2-in. straps welded together as shown in the accompanying sketch. The halves are bolted together and the assembly then is slipped over the end of the pipe (or metal expansion ring), where it is held in place by a pair of light wires passed around fins raised in the pipe or ring metal for the purpose.

Tip construction and its application to a 20-in. ventilating pipe.



Cash Values

If this Operating Ideas section could be analyzed from the standpoint of cash saved in short cuts to profits by their use in the field, we venture to say that S.E.C. would immediately order an investigation to determine why so many dollars were returned on the low capital investment cost of the reader's time. We know that each idea does not fit into the exact operating scheme of everyone who reads them, but even one out of every fifty or every hundred published may have a direct application which will save many dollars over your present method of doing a thing in or around your mine. So, Operating Ideas have cash values. Not only to those who read and use them but also to those who figure them out originally, practically apply them and then write them up for publication in Coal Age, which pays $5 or more for each acceptable idea. Just send description of the new "kink," supplying sketch or photograph to make it clearer, and Coal Age will do the rest.

Cost of Pump Maintenance Cut by Arc-Welding

Arc-welding in the field of mine drainage includes, among other things, the repair of pumping equipment, declares Paul F. Erch, mechanical draftsman, Glen Alden Coal Co., Scranton, Pa., in a paper receiving honorable mention in the $200,000 Award Program sponsored by the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio (*Coal Age*, October, 1938, p. 90).

"At present," says Mr. Erch, "most of the pumps used in coal mines are motor-driven centrifugal units and, due to the high pressures on some of the stuffing boxes combined with the acidulous nature of the water and the grit which it frequently contains, very severe wear often takes place on the pump shafts. Even though bronze or chrome-iron protecting sleeves usually are installed in the stuffing boxes, the shafts often are damaged where the sleeve wall wears through. To discard these shafts, of course, is rather expensive. Instead a sufficient layer of new metal is arc-welded on and the shaft machined to original dimensions, after which it is as good as new with a comparatively small expense. An average net saving in this case would be about $30.

"The rotating elements of these pumps are changed rather frequently due to the rapid wearing away of the impellers and their sealing or wearing rings. This occasions heavy interstage leakage with consequent loss of capacity and efficiency. Usually these impellers and their rings are cast of anti-acid bronze (75 per cent copper, 10 per cent tin and 15 per cent lead), but chrome-iron alloys now are coming into extensive use because they will stand up for a longer period of time. However, it has been found necessary to have a greater initial clearance between impeller and casing ring with such material, due to its great tendency to seize. By using stainless steel for the casing rings for a chrome-iron impeller a sufficient difference of metal texture is obtained to overcome this trouble somewhat. But the cost of stainless-steel rings in diameters ranging from 6 to 18 in., whether cut from heavy-walled tubing or from solid shafting, is very high; therefore, the practice has been adopted of forging up rings from suitable heavy flat bar stock into a hoop shape and closing them by arc-welding with a similar stainless-steel welding rod. This forms a blank from which the finished ring may be machined. Savings as high as $40 per ring may be effected easily.

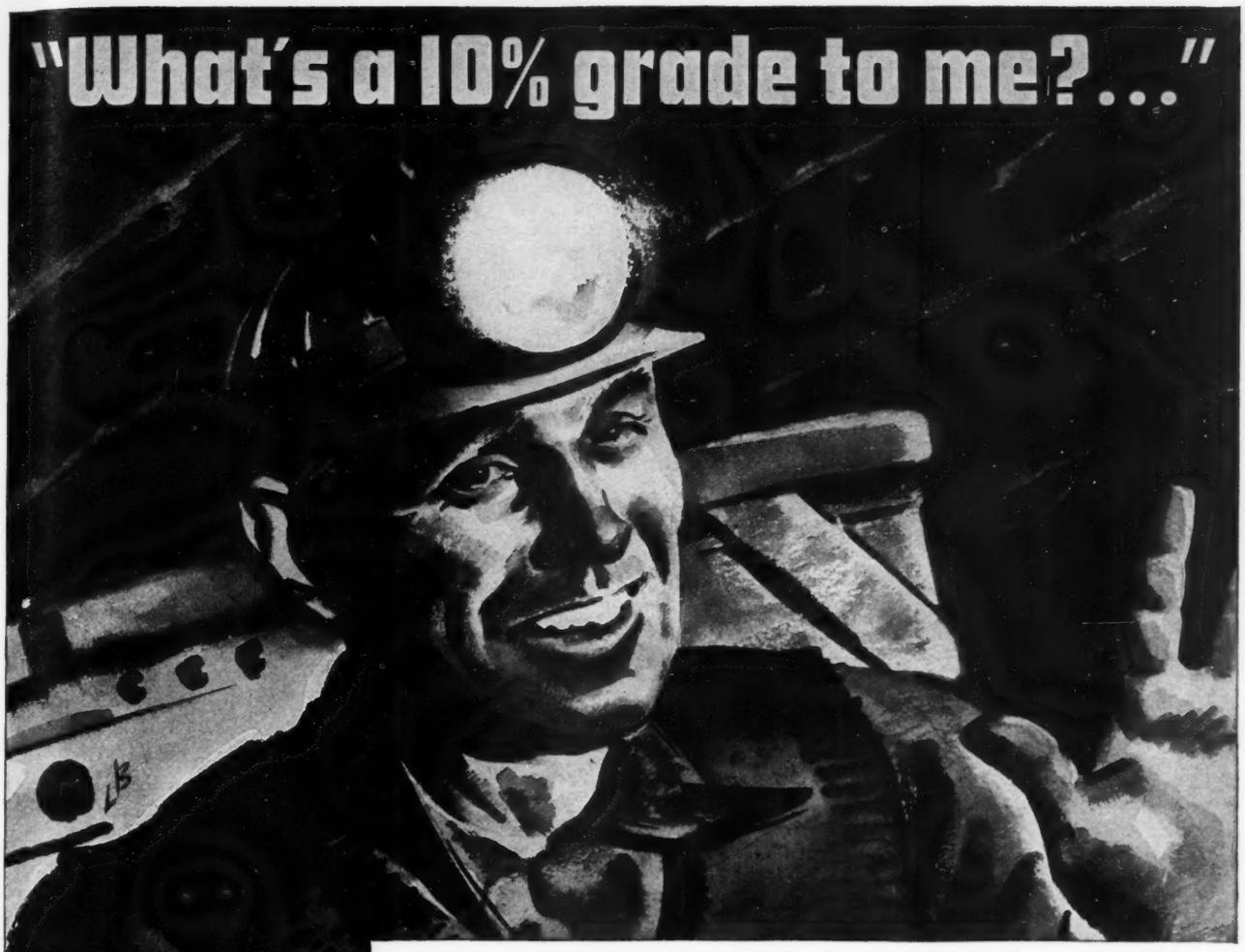
"Sometimes severe local wear takes place in the casings of centrifugal pumps, but by getting them into the shops where new metal can be arc-welded into the worn spots, followed by remachining the casing where necessary, they can be put back into useful service again for perhaps twice the length of life they otherwise would have. The same thing applies where a casing has become cracked or broken due to freezing, severe water hammer, falls of mine roof, pipe strains or accidents in handling.

"Pumps frequently are released from service as mining progresses and new pumps are developed with new pumping heads and other conditions, but it often is possible to adapt the old pump to handle the new job satisfactorily by fitting it up with a new (usually larger and higher speed) motor. This change may call for an entirely different baseplate which may be fabricated from steel by arc-welding. The saving in this case would be practically the cost of the patterns required to cast a plate, averaging about $45.

"New coupling guards and splash shields, likewise, usually are made up by arc-welding sheet steel and small angle irons. Sometimes this refitting calls for rather radical changes, such as dividing a sectional multistage pump into two or more units with fewer stages. This may require the building on of additional bearing bracket mountings, which can be done best by arc-welding suitable special cast pieces to the casing wall.

"Adaptation of old pumps to special new requirements have been made by arc-welding on auxiliary nozzles to lower stages so as to take off water at two or

"What's a 10% grade to me?..."



. . . . with 10% grades against the load this mine uses Exide-Ironclad Batteries

There are so many factors in mining that can't be controlled. In this mine, for instance, entries were laid out for a 1% grade and rooms for a 4% grade—both in favor of loads. But a tricky floor caused many a 10% grade against the loads, and posed a problem on how to maintain speedy haulage service along with economy of power.

Battery locomotives equipped with Exide-Ironclad Batteries were the answer here, as they have been in hundreds of mines under every haulage condition.

The tremendous reserve power of these batteries enables them to take heavy loads and tough grades in their stride. Their sustained voltage keeps haulage speeds good throughout every shift. Their long, trouble-free life means marked economy. Write for free booklet, "The Storage Battery Locomotive for Underground Haulage."

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more different pressures. Change in direction of rotation of a centrifugal pump usually entails some difficulty due to the right-hand and left-hand threads for the sleeves, or nuts, which hold the impellers in place on the shafts. It has been found quite feasible simply to arc-weld all the shaft threads full and then rethread for the opposite rotation, thus saving the buying or making of an entire new shaft. Again, the average net saving would be about $30.

"Pump casings have been strengthened, where found to be weak or to enable them to meet new higher head conditions, by arc-welding new ribs of cast or forged metal onto the outside of the casing walls or by making the regular flanges of the casing heavier in this way."

Hydraulic-Brake Principle Provides Remote Control

Practically unlimited use is claimed for a remote-control system for hoists, switches, machines, etc., offered by A. P. Gunther, electrician, Mine No. 5, Gillie Coal Co., Bokoshe, Okla. The idea is nothing more than the application of the hydraulic-brake principle to various control problems by means of levers, pulleys, gears, springs, etc., to deliver the required motion at the required time. "We have applied this idea to a rock-dump hoist which sits on the ground but is controlled from the tipple, and some of our switches are controlled from a distance in the same manner."

The main items in the control system are a master cylinder from an automobile or truck, brake cylinder, copper tubing, hydraulic fluid and material for connecting the brake cylinder to the machine. "So far, we have found the size of the master cylinder sufficient for all our jobs. As the brake cylinder is of the double-expansion type and therefore somewhat complicated to mount if its complete motion is to be utilized, we construct our own expansion cylinders, using the plungers and cups salvaged from the original brake cylinders and fitting them into pipe lengths which have been machined to fit. The plunger rod is permitted to come out one end through a guide while the other end is closed and provided with an opening tapped out to fit the pipe from the master cylinder. Cylinder mountings may be welded on or, before machining, the pipe may be heated and flattened on one end to form a seal. Mounting holes may be drilled through this flattened end; also the opening for the tube. The length of the cylinder is determined by the capacity of the master cylinder or the amount of motion required.

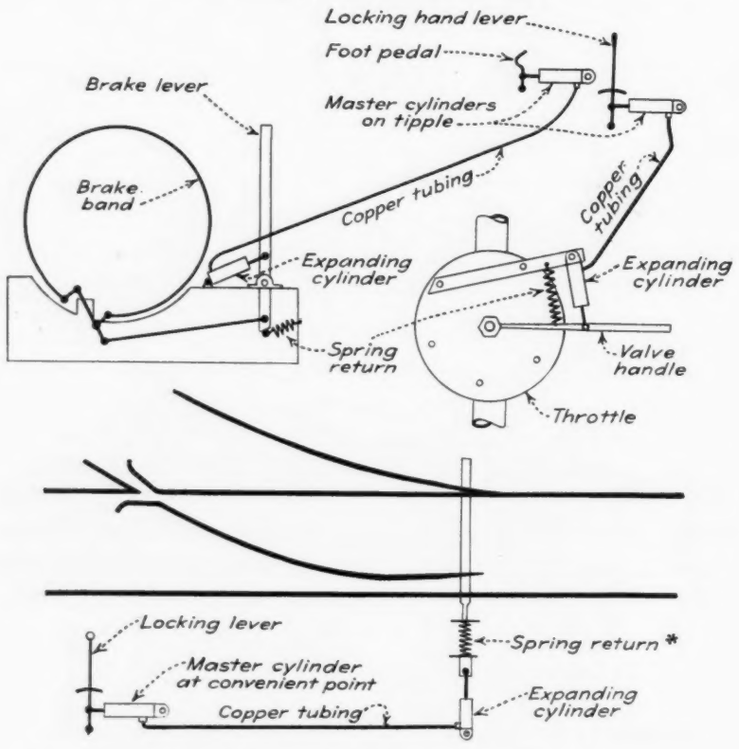
"The master cylinder may be operated by a foot pedal or a hand lever. It can be constructed to lock in any position or return to normal, thus keeping the expansion cylinder in any desired position. Springs must be used to return the cylinders to normal unless two sets are used, one set opposing the other. The cylinders are connected to the master cylinder by tubing, just as in a car. Master cylinder and tubing then are filled with hydraulic fluid, being sure to work the air out of the line by bleeding it.

"The methods used to connect the expanding cylinders to the machines will vary. Connection may be made directly to the lever to be moved or gears may be used. When connecting to levers, the travel required for operation may be changed by changing the effective radius. The accompanying illustrations show diagrammatically how hydraulic controls have been applied to throttle valves, hoist brakes and track switches. These are only part of the possible applications, however.

"Airplane-type shock absorbers found on the later types of cars can be made into ideal expansion cylinders with very little effort. As both ends of the absorber are closed, it can be utilized as a double-acting cylinder for both push and pull. The same applies to its use as a master cylinder, which provides a push-pull action with one master and one expanding cylinder. Of course, two tubes must be used.

"We also use an old brake cylinder to start and stop our pumps. This is safe, because all pumps are below the sumps, thereby assuring that they are primed. The brake cylinder is arranged as a low-pressure switch and is connected in series with the holding coil of the starter box. By adding or removing weight from the brake-cylinder plunger it is adjusted to close the holding-coil circuit at a predetermined pressure (full sump), thereby starting the pump. When the sump is empty and the pressure is down, the plunger falls, breaking the circuit and stopping the pump. A float switch also can be connected in series with the holding coil so as to start and stop the pump at a predetermined time. We do not use this system on any pump unless it has positive priming."

Showing diagrammatically how hydraulic cylinders are used in the remote control of hoist brakes, throttles and track switches.



* May be replaced by separate hydraulic circuit to return points to normal position

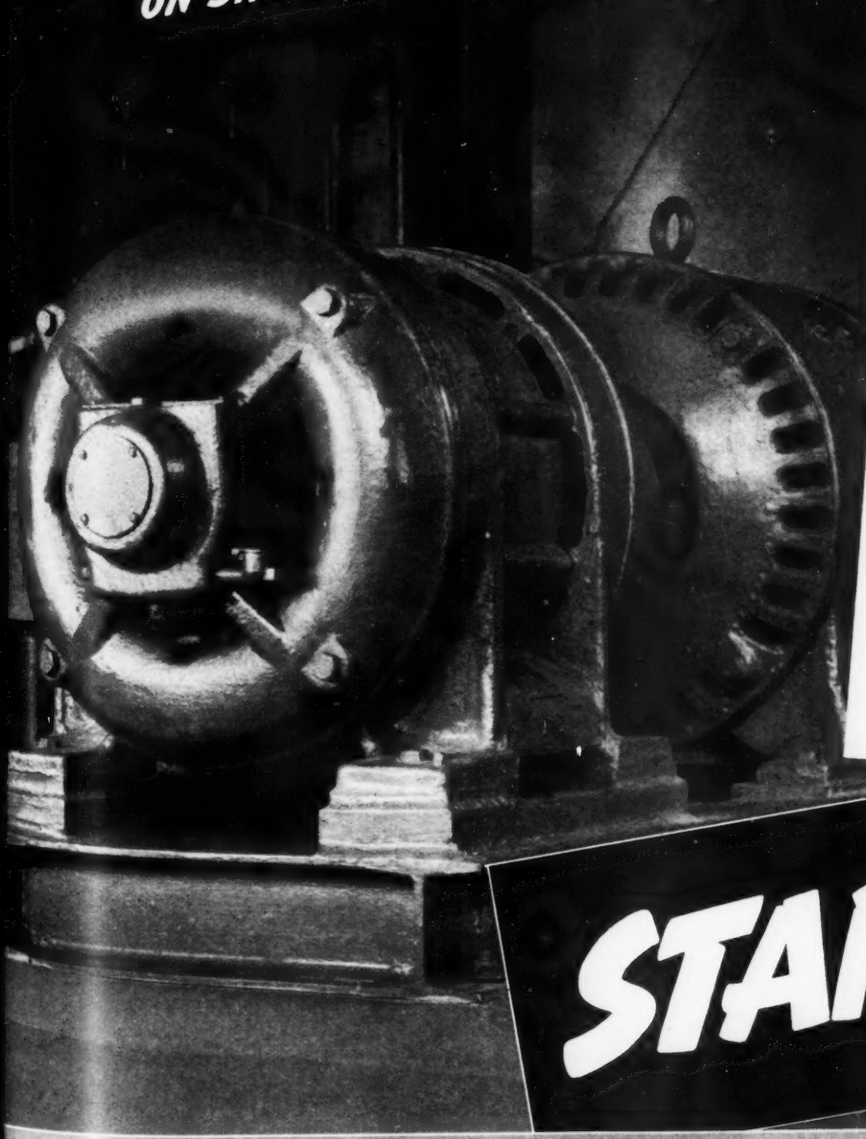
Trips on Slope Controlled By Men in Mine Cars

A signal system enabling men in cars on a slope to signal the hoisting engineer, submitted by Samuel Hockaday, electrical laborer, first class, Miles Slope, Olyphant Colliery, Olyphant, Pa., was adjudged the best safety suggestion submitted in April by an employee of the Hudson Coal Co., the company's *Safety Commentator* reports. "Some time ago at the Miles slope, in order to promote safety on the No. 10 (main) slope, a signal button was attached to the roof directly over the point at the Dunmore No. 4 bed where the man trips stop to take on and discharge men going to and from their work," Mr. Hockaday stated. "The signal was placed at this point to eliminate the necessity for a footman or other employee getting into the trip after he had signaled the engineer. As a further safeguard it was proposed that several more of these signals be placed at intervals along the slope, with an electric light at each so that they could be located easily.

"There is no 110-volt circuit along the

REPLACES 2 OILS AND SAVES BEARINGS

ON SHOVEL MOTOR-GENERATOR SET...



• ORDINARILY, shovel operation in stripping required two oils, one for summer and one for winter lubrication of motors and motor generator bearings. A central state operator was having trouble during the spring and fall seasons, when temperatures varied widely, in determining just when to change oil. Each change of season brought a disheartening number of bearing failures.

The Standard Lubrication Engineer told him about Stanoil No. 25, an oil with low pour test that maintains its lubricating quality over a wide range of temperatures.

With Stanoil No. 25 in the bearings the year around, the chief electrician found that he could quit trying to outguess the weather man. Bearing failures stopped, and, in addition, he had one oil less to stock. The slightly higher cost of the oil was more than paid for by saving in bearings and repair costs.

It's almost certain that somewhere in your operation the higher quality in Stanoil will pay its way in reduced maintenance and lower ultimate oil costs. Let a Standard Lubrication Engineer point out some of these places. He'll make this analysis at no cost to you. Call him at the nearest Standard Oil (Indiana) office or write 910 South Michigan Avenue, Chicago, Illinois.

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Read what Harry Owens of Montana Coal & Iron Company says about Cincinnati Chains.

"WE ARE about to the point where we have decided to buy one of your cutter bars and chains for our ..... combination mining machine. The chain you sold us for our ..... mining machine is still in service. It has made a hit with all our men; the machine operators, mechanics and bosses who have to fight these things down in the mine and get the work done. They report that this *chain has never been broken* and they are unanimous in saying that it is *absolutely the best chain they ever saw in every respect.*"

UNSOLICITED REPEAT ORDERS PROVE the SUPERIORITY of CINCINNATI CHAINS. You too can lower costs and increase production through the use of Cincinnati Cutting Equipment because it eliminates down time at the face, increases the rate of cutting and decreases power requirements, machine maintenance costs and bit setting time. Why not start to change over now? Our engineers will be pleased to help you. Write us today for more information.

The Cincinnati Mine Machinery Co.

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slope to furnish current for lights and therefore I suggested a different method." An installation was made and "has proved satisfactory." Under this arrangement, "the signal system consists of a small pull switch to which is connected 100 ft. of sash cord. The sash cord is supported by eyebolts inserted in pieces of 1¼-in. pipe which are installed in the roof at 25-ft. intervals. The end of the cord is fastened to the fourth hanger. A coil spring at the pull switch keeps the cord tight and takes its weight off the pull switch.

"The cord is about 30 in. higher and 20 in. outside the rail. It is located thus so that it will not interfere in any way with the operation of trips on the slope. A person sitting on the right side of the man-trip can reach the cord without leaving his seat. When an employee grasps the cord, the resulting contact rings a bell in the engine room. All men are familiar with the fact that one pull on the cord is the signal for the engineer to stop the trip. As stated, one of these signaling devices has been installed near the Dunmore landing in the Miles slope. As far as I know, this is the first time in the hard-coal field, or at least in this part of the coal region, that men in the man-trip have actual control of the signal so that in an emergency, without a man leaving the trip, it can be brought to a stop."

Gas-Powered Portable Winch Used in Tipple Rebuilding

"Labor-cost distribution in the first two weeks of major repairs to and rebuilding of a timber coal-mine tipple revealed that about one-third of the mine utility truck driver's time and a large portion of the timbermen's time was devoted to raising timbers, lumber and machinery parts to the top of the bins," writes K. N. Banthin, mining engineer, Oak Park, Ill. "Upon being questioned, the top boss replied: 'When I have a piece of timber or machinery to hoist, the truck is on its other jobs and then I have to use four or five men on a line. If I hoist it all at one time, I don't have room for the men to work.' The truck driver, in turn, responded as follows: 'I have plenty of other jobs running after materials, cement and cleaning up to be around all the time.'

"It was apparent that some other means of hoisting materials was necessary and that it be ready at all times and not require so much manpower. A study of

Weighted down with sand bags, the winch is ready for work.

loads and conditions revealed that a small winch with a cat-head and designed so that it would be portable would do the job. As only 440-volt power was available on the surface it was felt that in the interests of safety the unit should be gasoline-powered. The winch, shown in the accompanying illustration, was constructed in the mine shop, using materials and parts as follows:"

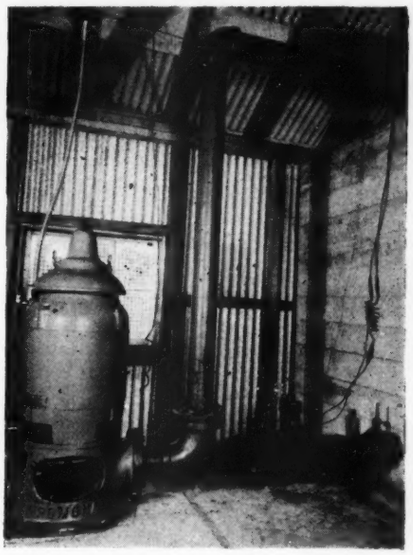
Frame, air-cooled engine (NewWay, 5 hp. at 800 to 900 r.p.m.), wheels and truck, formerly part of an old pumping unit (purchased used)	$25.00
Repairs to engine	12.50
Used gear reducer (D. O. James, 1,150 to 55 r.p.m.)	5.00
New gear for reducer	3.50
Cat-head (12 in. wide, 10 in. in diameter), on hand at the mine, salvage value	1.00
Couplings, used and on hand at the mine, used value	5.00
Shop labor to rebuild unit and fit new parts on pump frame	18.00
Total cost	$70.00

"On the basis of labor cost in the first two weeks, a saving of one week of labor time would pay for the unit. It relieved the truck driver of any services to construction work and necessitated only two men for hoisting. Since the construction of the winch it has been used for making repairs to the boiler house and fan house and as an auxiliary car puller on the storage track. The air-cooled motor started even in winter weather and no one had to worry about freezing."

Water Cost in Alabama Mine Reduced by Turbine Pump

Two centrifugal pumps were displaced, power cost was cut to a third, and three shifts of pumping labor were saved by a mine-drainage improvement now in operation at Blossburg "E" mine of the Brookside-Pratt Mining Co., Blossburg, Ala. This resulted from the installation of a deepwell turbine pump about a year ago, at that time thought to be the first of the deepwell turbine type to be used for dewatering mines in the Alabama field. Since then, the same company has installed another such pump at the New River mine, at Winfield.

A large percentage of the water that entered Blossburg "E" mine came from old workings on a higher level which were connected to the lower, or present, workings by an underground shaft 80 ft. deep near a slope leading from the surface down to the upper level. As indicated in Fig. 1, a 20-hp. 500-g.p.m. centrifugal pump was maintained at the foot of the slope and another 20-hp. 200-g.p.m. unit at the bottom of the shaft. Pumpers had the dangerous job of climbing to and from the lower pump on a ladder in the 80-ft. shaft.



The pump discharges over the top into the "lubricating" tank. Wires at the right connect with the solenoid valve in the lubricating line.

All pumping from the upper level and the leakage from that level down into the shaft were eliminated by building a dam, or bulkhead, at the foot of the old 10-in. borehole, which was a discharge for the lower pump. Concrete for this bulkhead was poured down the borehole, thus holding the cost of building the bulkhead to a relatively low figure.

The new deepwell turbine pump is a Pomona unit rated at 200 g.p.m. and is driven by a Westinghouse Type CS 220-volt linestart squirrel-cage motor. The

L. A. Kelly, superintendent (left), and Carl Johnson, chief electrician, view with satisfaction this solution of their pumping problem. The sloping pipe is the pump discharge from the top of the "lubricating" tank to the creek. At the right is the casing of the electrode borehole.

well casing is 8 in., the pump-column pipe 4 in. and the pump depth 120 ft. To resist corrosion from the highly acidulous water, the impellers are made of bronze and the rod, or drive shaft, of alloy steel. In addition, the column pipe is lined with an asphalt coating.

Control and priming are fully automatic and there is electrical protection against loss of water. An arrangement of electrodes, a water-storage tank for bearing lubrication, a solenoid gate valve, timing relays and a Westinghouse De-ion starter do the trick. Starting and stopping electrodes for normal operation are down in the mine on the ends of control wires hung in a separate borehole, as shown in Fig. 1. The pump starts whenever the water level rises to the upper electrode, and stops when the level drops to bare the lower electrode.

Another electrode, in the "lubricating" tank, also must be covered with water before the pump can start. This precludes the chance of starting without water in the column to cool the bearings, thus protecting against bearing and shaft damage. Normally the solenoid valve is opened 1½ minutes before the motor is started, which time insures complete drenching of the rubber bearings.

Fig. 1—Showing old pumping layout and how the new deepwell turbine unit was installed to reduce power cost.

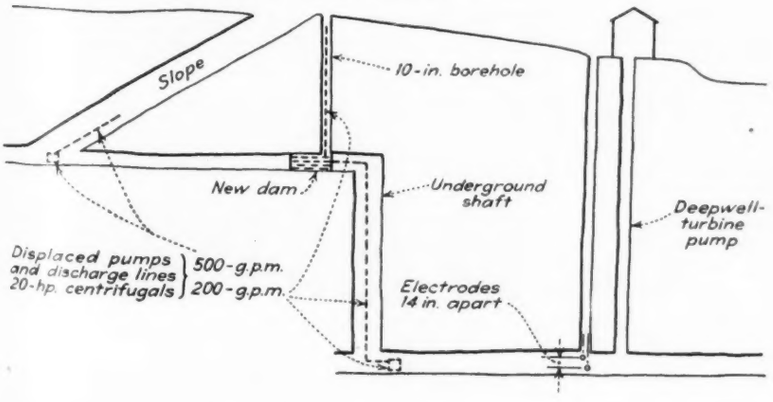
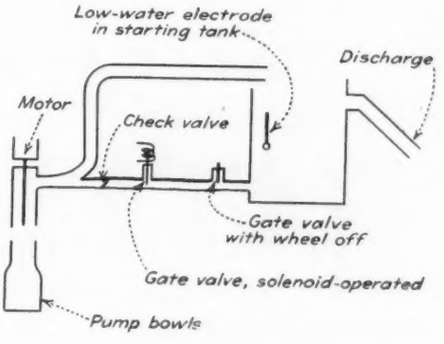
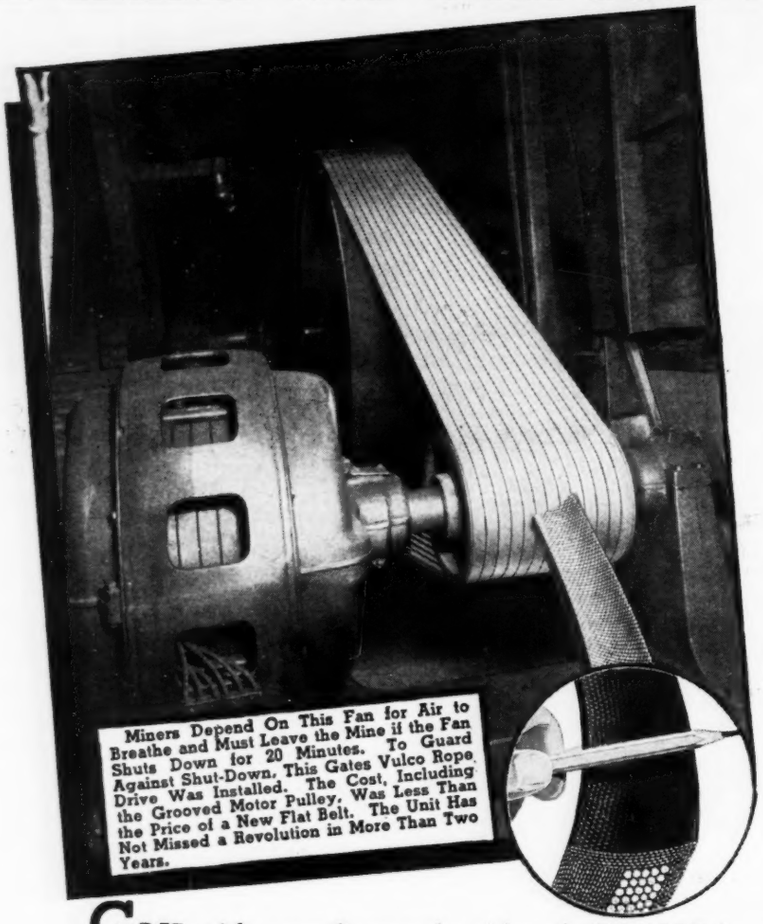


Fig. 2—A tank holds water in reserve for lubricating the rubber bearings when the pump is started up.



FEEL the SIDES of a V-BELT *as it Bends!*



Miners Depend On This Fan for Air to Breathe and Must Leave the Mine if the Fan Shuts Down for 20 Minutes. To Guard Against Shut-Down, This Gates Vulco Rope Drive Was Installed. The Cost, Including the Grooved Motor Pulley, Was Less Than the Price of a New Flat Belt. The Unit Has Not Missed a Revolution in More Than Two Years.

PROVE for YOURSELF *this SAVING in BELTS and POWER!!*

THE **CONCAVE SIDE** IS A GATES PATENT

GRIP with your fingers the sides of *ANY* V-Belt—then bend the belt as it would bend in going around a pulley. You will *feel* the sides of the belt *change shape!* If the sides were *straight* before bending, they become *convex* as the belt bends. (See Figure 1 on the right). Note the out-bulge of the sides.

Now look at Figure 2. This shows the *same* shape-change in a belt with the patented concave side. But what a different result! This belt, when bent, precisely fits the sheave-groove. Two big savings result—(1) There is no side-bulge and this means uniform side-wall wear—*longer life!* (2) There is a full side-width grip on the pulley and this carries heavier loads without slippage—saving the belts and also saving your *power!*

The Gates Vulco-Rope is the only V-Belt built with the patented concave side.

What Happens When a V-Belt Bends

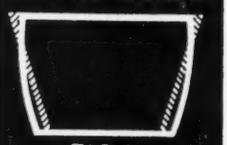


FIG. 1

FIG. 2

THE GATES RUBBER COMPANY

Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

CHICAGO, ILL., 1524 South Western Ave. HOBOKEN, N. J., Terminal Building BIRMINGHAM, ALA., 1631 1st Ave., S. LOS ANGELES, CAL., 741 Warehouse St.

DENVER, COLO., 999 South Broadway DALLAS, TEX., 2213 Griffin Street PORTLAND, ORE., 1231 N. W. Hoyt St. SAN FRANCISCO, CAL., 2700 16th St.

WORD FROM THE FIELD

Pittsburgh Coal Co. Awards Engineering Scholarships

Two annual scholarships in mining engineering at Pennsylvania State College have been established by the Pittsburgh Coal Co. for miners and sons of miners with qualifications to become trained mining engineers. Selection is based on high-school scholastic records and general all-around ability, character and personality. The scholarships have a value of $300 each, the funds being paid in two installments, one half at the beginning of each semester. It is required that the winner of a scholarship have a satisfactory record in his studies at the end of the first semester in order to continue. If students' work is satisfactory, the scholarships continue for four years.

The winners of the first scholarships, for which applications closed on July 15, are: Alfred Arnold, 22, employed for the last four years as a loader and mechanic at the company's Warden mine, and Joseph Fiedorek, 19, employed for more than a year as a loader at the Montour No. 9 mine. They were unanimously chosen by a scholarship committee of four headed by J. B. Morrow, vice-president of the company, from 43 candidates. The recipients have complied with the entrance requirements to Penn State. Other members of the scholarship committee are: P. T. Fagan, president, district 5, United Mine Workers, and H. C. Rose and J. T. Clark, Pittsburgh Coal Co.

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Anthracite Week Advanced

"Anthracite Week," an event which has been celebrated in northeastern Pennsylvania annually for the last several years, will be observed beginning Sept. 18 this year instead of in October. The change was decided upon at a regional meeting of the Citizens' Anthracite Conference in Wilkes-Barre, attended by delegates from Scranton, Wilkes-Barre, Pittston, Hazleton and Pottsville.

The date was advanced to tie in with the observance of "Anthracite Day" at the New York World's Fair, Sept. 16, which will climax four-day tours by Chamber of Commerce groups from the five cities to Canada and northern anthracite-consuming areas.

—◈—

Mechanization Group Elects

The Mechanized Mining Commission, created by the Appalachian wage agreement, signed in New York City on May 13 last, has by unanimous action selected the following officers: chairman, D. C. Kennedy, secretary, Kanawha Coal Operators' Association; secretary-treasurer, Thomas Kennedy, secretary-treasurer, United Mine Workers; assistant secretary-treasurer, Stanley C. Higgins. Members of the commission are: for the operators —M. L. Garvey, J. D. A. Morrow, Charles O'Neill, L. T. Putman, W. L. Robison, P. C. Thomas, W. J. Wolf and L. E. Woods or their representatives; for the U.M.W.—John L. Lewis, Philip Murray, Thomas Kennedy, Van A. Bittner, Samuel Caddy, P. T. Fagan, James Mark and John Owens or their representatives. Future meetings of the commission will be held at the call of the chairman.

Keeping Step With Coal Demand

Bituminous Production

Week Ended	1939 (1,000 Tons)	1938* (1,000 Tons)
July 1	6,738	5,280
July 8	5,972	4,688
July 15	7,142	5,732
July 22	7,150	5,819
July 29	7,378	5,917
August 5	7,300	5,853
Total to Aug. 5	196,532	179,805
Month of July	**29,490**	**23,367**

Anthracite Production

July 1	866	991
July 8	484	325
July 15	763	557
July 22	758	639
July 29	748	1,003
August 5	766	547
Total to Aug. 5	30,115	27,932
Month of July	**2,913**	**2,580**

* Outputs of these two columns are for the weeks corresponding to those in 1938, although these weeks do not necessarily end on the same dates.

Bituminous Coal Stocks

	(Thousands of Net Tons) July 1 1939	June 1 1939	July 1 1938
Electric power utilities	6,693	6,740	8,067
Byproduct coke ovens	3,548	2,598	5,000
Steel and rolling mills	520	545	716
Railroads (Class 1)	4,469	5,196	4,827
Other industrials†	7,515	7,534	9,002
Total	22,745	22,613	27,612

Bituminous Coal Consumption

	(Thousands of Net Tons) June 1939	May 1939	June 1938
Electric power utilities	3,327	3,032	2,846
Byproduct coke ovens	4,361	3,383	2,931
Steel and rolling mills	671	678	588
Railroads (Class 1)	5,751	5,915	5,298
Other industrials†	7,425	7,510	7,233
Total	21,535	20,518	18,896

† Includes beehive ovens, coal-gas retorts and cement mills.

Prolonged Hearing Delays Coal-Price Minimums

WASHINGTON, D. C., Aug. 19—Final hearing on minimum prices in the East (Districts 1-8) under the Bituminous Coal Act, which began on July 24, has continued five days a week with an impressive volume of testimony presented and prolonged cross examination of Coal Division witnesses. In opening the sessions, Presiding Examiner Thurlow G. Lewis said the hearing would relate to coordinated minimum prices and it was not contemplated that any data on costs or marketing rules and regulations would be received except the limited amount necessary for proper continuity. Protests filed up to Aug. 12, including those from district boards, individual producers and consumers, totaled 440.

The Eastern hearing has been prolonged to such an extent that that for Districts 9-14, originally scheduled to begin Aug. 7 and then postponed until the 15th, was again deferred until the 22d, and may now be put off until well into September. All of which adds to the uncertainty of when minimum prices will be set.

Staff Cut in Economy Wave

Conforming with the President's request for economies, Secretary Ickes announced this week that 43 employees of the Coal Division have been let out. Principally affected were attorneys, clerks, trial examiners, price examiners and their assistants. This slash, added to the saving resulting from abolition of the seven commissioners and the former commission secretary, is estimated to bring the saving close to $250,000 annually.

Efforts to amend the Guffey-Vinson act by the Committee for Amendment of the Coal Act "will be pursued relentlessly," according to Chairman John A. Howe, vice-president, Truax-Traer Coal Co. The committee, which sponsored the Allen bill to repeal the coal act, purposes pressing for action on the measure when Congress meets in January. Mr. Howe says the country needs to be educated to the importance of the coal industry as a factor in national prosperity. "If the price schedule submitted by the Coal Division goes into effect," commented Mr. Howe, "it will cause general dissatisfaction. It will be injurious to the coal industry and to the public. If it does not go into effect, it will continue to result in millions of dollars of losses to the coal industry, so that in either event it needs the attention of Congress at the earliest opportunity."

Application for provisional approval

as a regional marketing agency has been made to the Coal Division by Belleville Fuels, Inc., and a hearing has been ordered. In its application the agency stated that it proposed to sell the coal mined by six companies operating seven mines in the Belleville and DuQuoin districts in Illinois, which produced approximately 5,300,000 tons in 1936. The companies are: St. Louis & O'Fallon Coal Co., Pyramid Coal Corporation, Southwestern Illinois Coal Corporation, United Electric Coal Cos., Union Colliery Co. and Truax-Traer Coal Co.

The Coal Division has granted permission to twelve producers in Illinois, Ohio and Virginia to withdraw applications for exemption from the price and marketing rule provisions of the bituminous coal act. Exemption had been sought on the ground that the companies sold their coal in intrastate commerce in their respective States; but orders by the Coal Commission, subsequently ratified by the Coal Division, found that substantially all intrastate transactions in coal in those States affected interstate commerce and thus were within jurisdiction of the coal act.

Utility Plant to Use Coal

A four-million-dollar 40,000-kw. steam plant that will consume 120,000 tons of coal annually is to be erected at Mobile, Ala., by the Alabama Power Co. Thomas W. Martin, president of the company, said it was to be the first of three units to be built.

Rejects Progressive Petition

The National Labor Relations Board dismissed late in July a petition of the Progressive Mine Workers concerning representation of employees of the Alston Coal Co., Pittsburg, Kan., and requesting an investigation and certification of representatives pursuant to the National Labor Relations Act. The board found that the unit claimed by the Progressives did not constitute a unit appropriate for the purposes of collective bargaining and that, therefore, no question was raised concerning representation of employees of the company.

In May, 1938, it was shown, the Progressives persuaded most of the employees of the company, all of whom were then members of the United Mine Workers, to join the Progressives. The company was requested to recognize the Progressives as the collective bargaining agency of the employees. The employees, however, were willing to continue working under the terms of the contract between the company and the U.M.W. The company and the U.M.W. held that under the terms of the contract it was obligated to continue checking off dues for the U.M.W. during the life of the contract and that all employees of the company were required to join the U.M.W.

Under these circumstances the company refused to recognize the Progressives and, after repeated demands by the U.M.W. that its members should replace all employees who were not members, the company discharged five employees. Within a week all other members of the Progressives rejoined the U.M.W.

Bluefield Exposition Breaks Record For Attendance and Exhibitors

THE annual Southern Appalachian Industrial Exhibit at Bluefield, W. Va., last month—fifth since this exposition was launched under the sponsorship of the Pocahontas Electrical and Mechanical Institute with 2,800 coal men registered on the closing day of the 1935 venture—again demonstrated its strength and pulling power with both operators and manufacturers by smashing through with the greatest number of exhibitors and the largest attendance in its history.

As in the earlier years, the Norfolk & Western freight station terminal was converted into an exhibition hall for the three days of the exposition, Aug. 17-19. Booth spaces were taken by 129 companies and institutions displaying their own specialized products and by distributors handling many types of equipment and supplies for the mining industry. In order to minimize overcrowding, the exhibits were open to the general public only on Aug. 17, with attendance the last two days restricted to coal men and allied interests.

Increasing interest was shown in the miners' "gadget" display, which carried about 90 home-made devices revealing unusual ingenuity in both model and working-size appliances promoting safety, greater efficiency, and to save time in both surface and underground operations. Thirteen of the "gadgets" were originally selected by the contest judges, who awarded five cash prizes to the final winners, who were: F. E. Powers, for his Low Coal skooter; Charles Wilson, for his Humdinger mine-car safety coupler; Tom Luke and Albert Marriotti, for their Safety Shunt for shotfiring cable; Troski and Clark, for their Rail Connector, and Mangus and Gibson, for their Safety cutting-machine guard. Harry W. Payne, general superintendent, American Coal Co., of McComas, W. Va., was chairman of the miners' exhibit committee.

W. E. E. Koepler, secretary, and J. J. Lincoln, president, Pocahontas Operators' Association

Another feature of the closing day was a contest among almost 200 members of the Pioneer Miners Club who have worked in and around the mines of the two Virginias for 40 or more years, for three cash prizes, awarded to one for the longest accident-free record, another for the longest continuous service in the industry, and a third for the longest record with one company. H. C. Calloway was chairman of the Pioneer Club activities.

Roland C. Luther, Vivian, W. Va., served as chairman of the executive committee, with the following chairmen also officiating: John J. Lincoln, general committee; J. C. Smith, entertainment; Cliff W. Sykes, hotel reservations; P. D. Woods, golf; S. N. Worley, floor committee; T. A. Mitchell, reception; W. A. Buchanan, program, and W. E. E. Koepler, chairman, publicity committee.

Many Exhibitors Represented

The following manufacturers and distributors occupied booth spaces in the general exhibit hall:

Advance Car Mover Co., Air Reduction Sales Co., A. Leschen & Sons Rope Co., Albertson & Co., Ames Baldwin Wyoming Co., American Chain & Cable Co., American Car & Foundry Co., American Mine Door Co., Anaconda Wire & Cable Co., Appalachian Electric Power Co., Automotive Supply Co.

Banks-Miller Supply Co., Beckley Machine & Electric Co., Bethlehem Steel Co. (Wire Rope Division), Black & Decker Mfg. Co., Blackhawk Mfg. Co., Bluefield Hardware Co., Bluefield Supply Co., Boston Varnish Co., Browning Mfg. Co., Buchanan-Williamson Supply Co.

Cardox Corporation, Charleston Electrical Supply Co., Chicago Pneumatic Tool Co., Coal Age, Coffing Hoist Co., Colts' Patent Fire Arms Mfg. Co., A. D. Cook, Inc., Continental Paint & Varnish Co., Coppus Engineering Co.

Dayton Rubber Mfg. Co., Diamond Chain & Mfg. Co., Joseph Dixon Crucible Co., John C. Dolph, Co., Duff-Norton Mfg. Co., E. I. duPont deNemours & Co., (Paint Division), Duquesne Mine Supply Co.

Economy Fuse & Mfg. Co., Electric Controller & Manufacturing Co., Electric Railway Equipment Co., Electric Railway Improvement Co., Enterprise Wheel Car Corporation.

Fafnir Bearing Co., Fairbanks, Morse & Co., Forest City Paint & Varnish Co.

Gates Rubber Co., General Cable Co., General Electric Co., General Tire & Rubber Co., Gibraltar Equipment & Mfg. Co., L. H. Gilmer, Co., Goodman Mfg. Co., Goodyear Tire & Rubber Co., Goulds Pumps, Inc.; Guyan Machinery Co.

Hobart Bros., Ideal Commutator Dresser

the Advanced Dry Cleaner

the AIR SAND System

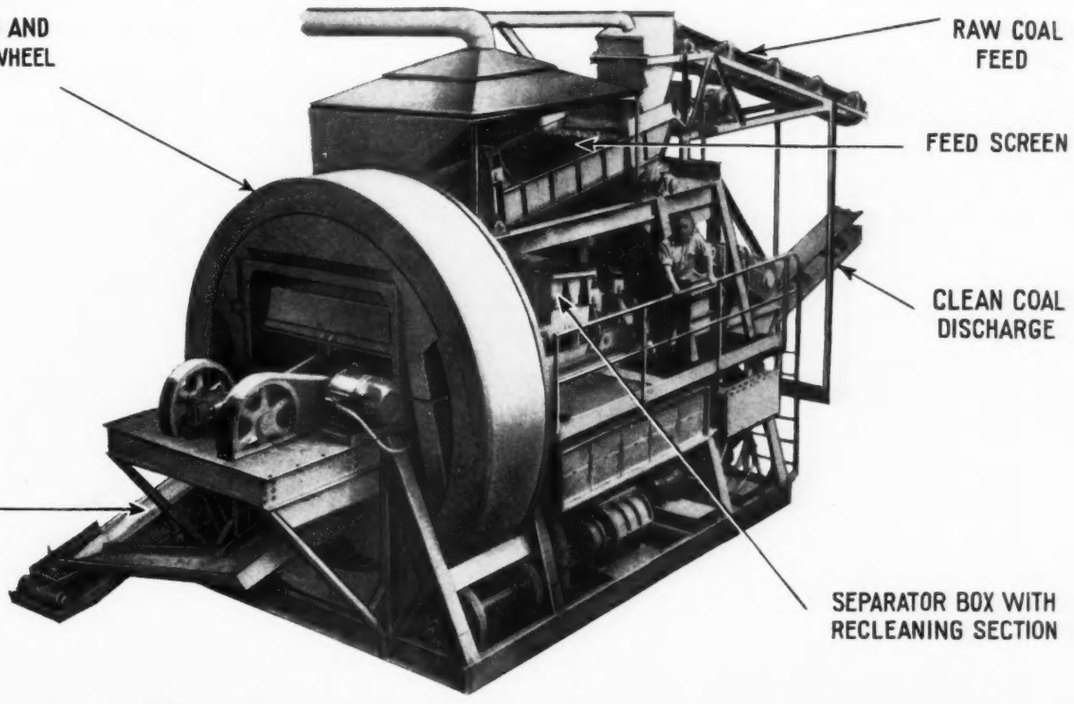
Accurately Separates Coal and Refuse
Avoids Coal Losses Eliminates Wet Coal Troubles

The full size plant of the improved Air Sand System, with revolving sand lift and new launder type separator, discloses in actual operation greater accuracy of separation and better all around performance in a compact machine than was formerly thought possible.

The Air Sand Cleaner dry cleans coal in fine sand made fluid by means of air continuously bubbled through the sand. Coal floats while slate and sulphurous impurities sink.

If you will provide us with complete information on your coal cleaning problem, we will gladly send you detailed recommendations and arrange for a quantity of your coal to be cleaned in one of the new, full size plants. You are invited to witness these tests. *Write us.*

—ONE OF THE AIR SAND DRY COAL CLEANERS IN ACTUAL OPERATION—



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STEPHENS-ADAMSON MFG. CO.

2 RIDGEWAY AVENUE

LOS ANGELES, CAL. AURORA, ILLINOIS BELLEVILLE, ONTARIO.

Co., Independent Pneumatic Tool Co., Ingersoll-Rand Co., I-T-E Circuit Breaker Co., Jeffrey Mfg. Co., Johns-Manville Corporation, Joy Mfg. Co., Kanawha Mfg. Co., Koehler Mfg. Co., Leetonia Tool Co., Lincoln Engineering Co., Linde Air Products Co.

Mabscott Machine & Supply Co., Manhattan Rubber Mfg. Co., Marathon Coal Bit Co., Marquette Mfg. Co., Mechanization, F. E. Meyers & Brothers Co., Mine Safety Appliances Co., Mosebach Electric & Supply Co., Mott Core Drilling Co., Nachod & U. S. Signal Co., National Carbon Co., National Electric Coil Co., Norma-Hoffmann Bearing Corporation, Norfolk & Western Ry. Co.

Ohio Carbon Co., Ohio Injector Co., Osmose Wood Preserving Co., O. P. Coal Burner, Bluefield Hardware Co.; Pennsylvania Electric Coil Corporation, Persinger Supply Co., Philips Mine & Mill Supply Co., Portable Lamp & Equipment Co., Post Glover Electric Co., Princeton Car & Foundry Co., Productive Equipment Co., Pure Oil Co.; Reliance Electric & Engineering Co., Republic Steel Co., Rochester Ropes, Inc., Rockbestos Products Corporation.

Safety First Supply Co., Sanford-Day Iron Works, Inc., Simplex Wire & Cable Co., Socony-Vacuum Oil Co., Solvay Sales Corporation, Southern Office Supply, Southern Oxygen Co., Charles W. Speidel & Co., Square D Co., Standard Oil Co. of New Jersey, Sullivan Machinery Co., Sun Oil Co., Superior-Sterling Co. (B. F. Goodrich Co.).

Tallman Mfg. Co., Tamping Bag Co., Templeton, Kenly & Co., Toledo Pipe Threading Machine Co., Trumbull Electric & Mfg. Co., W. S. Tyler Co.

U. S. Bureau of Mines, United States Steel Corporation, Utility Mine Equipment Co., Van Dorn Electric Tool Co., Virginia Polytechnic Institute; Westinghouse Electric & Mfg. Co., West Virginia Armature Co., West Virginia Rail Co., West Virginia University, West Virginia Geological Survey, Williamson Supply Co.

Cuts Illinois Research Fund

At the last moment before affixing his signature late in July, Governor Horner of Illinois slashed $120,000 from the appropriation approved by the Legislature for financing an experimental program designed to develop a smokeless fuel from Illinois coal. According to M. M. Leighton, chief of the State Geological Survey, however, work proceeded at once on the design and construction of a research laboratory and equipment to produce smokeless briquets.

Louis Ware Takes New Post

Louis Ware, president and a director of the United Electric Coal Cos. since October, 1935, has resigned the presidency to become president of the International Agricultural Co., but will retain his directorship in the former company. United Electric, which has offices in Chicago, operates strip mines in Fulton, Perry and St. Clair counties, Illinois.

A graduate of the University of Kentucky, College of Mining Engineering, Mr. Ware gained his first mining experience in Kentucky coal mines. Thereafter he had extensive experience in copper mining with several companies in Arizona, subsequently being engaged by the Guggenheim brothers in Chile, South America, and becoming general mine superintendent in charge of all Guggenheim nitrate mining projects, including a large explosives plant. On his return to the United States in 1929, he became engaged as a consulting engineer. From 1930 to 1935 he was connected with the New York Trust Co., New York City, in various engineering, banking and business assignments, after which he joined United Electric.

Louis Ware

Inspection Bill Goes Over

Senator Neely's bill (S. 2430) providing for government inspection of coal mines (*Coal Age*, June, p. 85) did not pass at the session of Congress which closed on Aug. 5. Opponents of the measure point out, however, that it retains its status when Congress reconvenes in January, being subject to final consideration without being reintroduced.

Sales of Mechanical Stokers Show Upward Trend

Sales of mechanical stokers in the United States during June last totaled 7,866, according to statistics furnished the U. S. Bureau of the Census by 101 manufacturers (Class 1, 54; Class 2, 29; Class 3, 34; Class 4, 28; Class 5, 13). This compares with sales of 5,238 units in the preceding month and 6,088 in June, 1938. Sales by classes in June last were: residential (under 61 lb. of coal per hour), 6,798 (bituminous, 5,894; anthracite, 904); small apartment-house and small commercial heating jobs (61 to 100 lb. per hour), 442; apartment-house and general small commercial heating jobs (101 to 300 lb. per hour), 359; large commercial and small high-pressure steam plants (301 to 1,200 lb. per hour), 180; high-pressure steam plants (more than 1,200 lb. per hour), 87.

Illinois Men Hear Talk On Insulating Materials

Selection and use of insulating materials were highlighted at the Aug. 4 meeting of the Southern Illinois Mining Electric Group, at the West Frankfort (Ill.) Country Club. There is, declared E. W. Davis, electrical engineer, Simplex Wire & Cable Co., Cambridge, Mass., the speaker of the evening, no universal insulation for wires and cables. Conditions varying with weather, geographical location, the industry and the use to which a cable is put determine the best type of insulation for each job.

High ambient temperature, as in a boiler room, may call for more heat-resistant insulation. Temperature produced by a large group of cables in one conduit also must be considered. In one instance, said Mr. Davis, the carrying capacity of such an installation was reduced 75 per cent because of heat radiation and lack of ventilation. Code tables of carrying capacity, he stated, apply to only a single set of conditions found in daily practice.

Cotton, asbestos, glass and fabrics in general are not considered insulators unless treated, but merely separators. In damp atmospheres some of them may even become conductors through absorption of moisture. When treated with a varnish or similar material, they become insulators, but their dielectric value may be much lowered—dependent upon the value of the material used in the treatment. While the bands of application may overlap, the range for different types of cable-insulating materials is approximately: rubber, up to 6,000 volts; varnished cambric, up to 15,000 volts; paper, up to 110,000 volts.

Relative insulating values of various rubber compounds, tapes and treated fabrics were demonstrated by a series of visual high-voltage tests carried to the point of breakdown. Emphasis was placed on the value of a properly prepared joint or splice and the necessity for using rubber tape as a basis for reinsulation. The original insulation on the wire, it was pointed out, must even be penciled off where the rubber taping is started, so that the joint insulation may approach or equal the original value. Square cuts where insulation is peeled off won't do.

Kinks Cut Values

How a hammer bruise or a kink will reduce insulating value of code wire 70 or 80 per cent was demonstrated in a second set of tests. Varnished-cambric resistance to puncture is reduced 50 per cent by scratching one side and 80 per cent or more simply by creasing it between the thumb and finger. Bias cut VC tape almost loses its dielectric strength by being slightly stretched, thus breaking the varnish coat.

An automobile tire must be black to wear well. Carbon black added to the rubber compound gives wearing qualities not only to tires but also rubber clothing. Unfortunately, added Mr. Davis, such rubber is not an insulator to be depended upon, as carbon black itself is a conductor. Beware of the idea that rubber boots are safe to wear when handling voltages running into the thou-

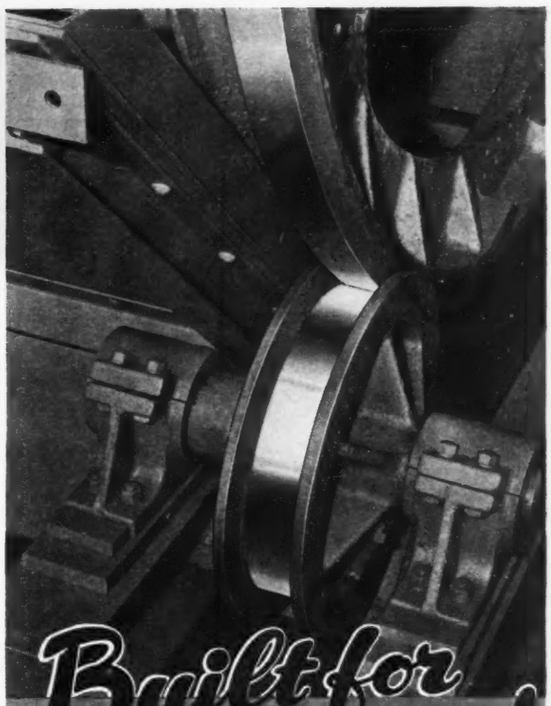
NOLAN
ROTARY CAR DUMPERS

SAVE time, save coal and cut mine car maintenance costs—by handling the dumping job with Nolan Rotary Car Dumpers. These sturdy powerful dumpers make completely practical the use of rigid, solid-body mine cars. Work is speeded up, safety promoted and coal is dumped with a minimum of degradation.

Nothing could be simpler nor more positive than the operation of the Nolan Rotary Dumper. The trip of cars is held in position by car control horns, with one car (or more, in multiple dumping units) in the dump ready for dumping. When the control is moved forward to operate the dump, the first portion of the movement withdraws the positive rail aligning stop. Further movement of the lever operates the motor contactor. The lever is held in forward position only momentarily and is then returned to neutral. The dump turns 360°, discharging all material cleanly, and then stops automatically in upright position.

Full information on Nolan Rotary Car Dumpers, Gravity Car Dumpers, Chain Trip Feeders, Automatic Cagers, Cushioned Car Stops and Mine Car Retarders is yours on request. ***We welcome difficult car control and car dumping problems and invite your inquiries.***

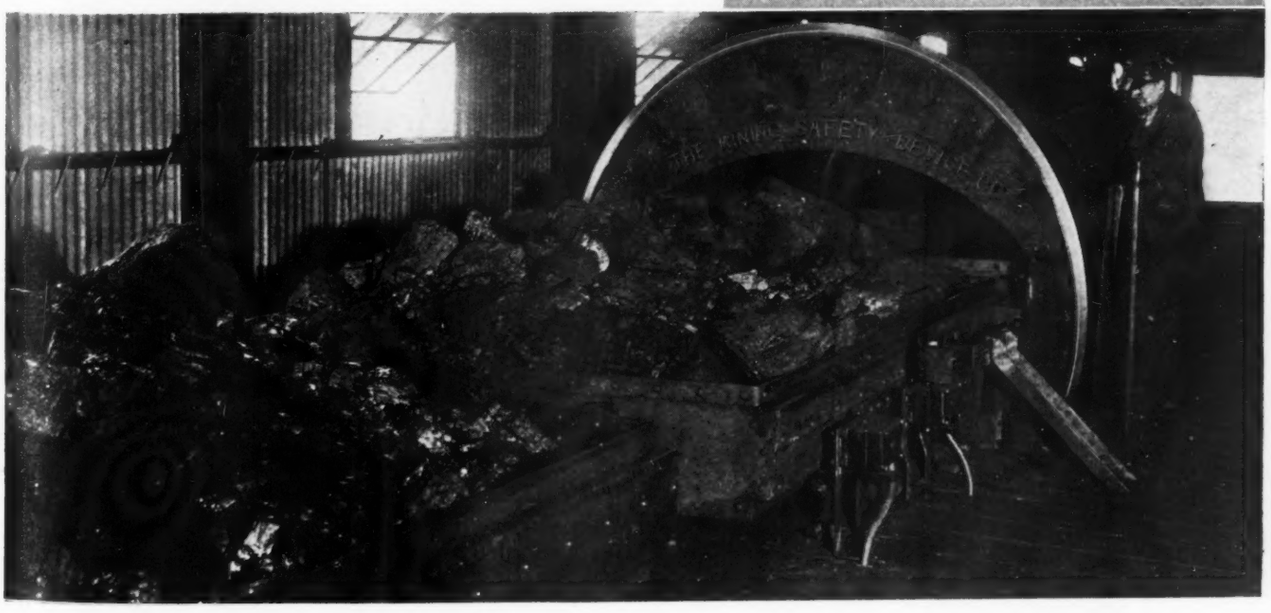
THE MINING SAFETY DEVICE COMPANY
BOWERSTON, OHIO



Built for Business!

NOLAN equipment is heavy duty equipment in the broadest meaning of the term! It is ***built for business*** — built right of highest quality materials throughout — to stay on the job and make profits for operators. ***Now equipped with Timken bearings.***

The first Nolan Rotary Car Dumper ever built is still on the job!



Harry M. Moses

sands, he warned. Rubber gloves are not in the black-rubber category, but they are easily torn. Rubber compounds now used for portable cables in mine applications, continued Mr. Davis, are resistant to corona damage up to 2,300 volts delta or 4,160 volts "Y"—the usual present-day voltage limits for mine service.

Resistance values of accidental grounds are so variable, explained Mr. Davis, that most efforts to locate faults are at best only roughly approximate. One good method is to apply vibratory current to the faulted cable and follow its course with a coil and telephone receiver. In the case of an unexposed end in one or more conductors of a cable, comparison of the capitance of the two ends gives a quite accurate ratio of the distance to the fault.

The demonstration closed with experimental proof that insulations will withstand very much higher d.c. than a.c. potential. Within the next ten or fifteen years, predicted Mr. Davis, we may see a revolution in high-voltage transmission of power by direct current. Absence of reactance, doubling—or more—of the value of insulators and the practical disappearance of corona losses until well past the 500,000-volt mark were among the reasons cited for such a revolution.

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To Give Welding Scholarships

Two $250 scholarships in welding engineering will be awarded annually at Ohio State University, Columbus, starting this autumn. Funds for the awards have been provided through the generosity of an alumnus, whose identity is not revealed.

According to James R. Stitt, assistant professor of welding, juniors and seniors in the welding engineering curriculum are eligible. Normally one scholarship will go to each of these classes, although it is provided that where one class lacks an eligible candidate, both men may be selected from the other. A faculty committee will make the selections, on the basis of scholarship, personality, character, leadership, enthusiasm and promise in welding engineering. Last year the university inaugurated a four-year course in welding engineering.

Moses Heads Program Group For A.M.C. Convention

National chairmanship of the program committee for the seventeenth Annual Coal Convention and Exposition of the American Mining Congress has been accepted by Harry M. Moses, president, H. C. Frick Coke Co., Pittsburgh, Pa. According to Julian D. Conover, secretary of the congress, the meeting will be held during the last week in April or the first week in May, 1940, the exact date and place of the meeting to be announced later. A nation-wide committee to serve with Mr. Moses is now being chosen, under whose direction the program for the meeting will be drafted.

Mr. Moses, who formerly was operating head of the United States Coal & Coke Co. in West Virginia, has had extensive experience as an engineer and operator also in Kentucky and Illinois. He has taken an active part in mine modernization movements and has been prominent in working for advancement of the industry.

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First-Aid Honors Captured By Consol Teams

With 33 first-aid teams participating and about ten thousand people in attendance, the eighth annual safety day contest of the Central West Virginia Coal Mining Institute was held July 22 under smiling skies at Jackson's Mill, W. Va. The institute, headed by E. J. Weimer, division superintendent, Koppers Coal Co., Grant Town, drafted Charles E. Lawall, president, West Virginia University, to act as master of ceremonies, while J. J. Forbes, chief supervising engineer, Pittsburgh (Pa.) Experiment Station, U. S. Bureau of Mines, officiated as chief judge. L. S. McGee, State mine inspector, Shinnston, W. Va., was director of the meet and N. P. Rhinehart, chief, West Virginia Department of Mines, awarded the prizes. Speakers included Homer A. Holt, Governor of West Virginia.

First place in the white division first-aid contest went to a team representing Mine No. 86, Consolidation Coal Co., Carolina, W. Va., captained by Frank Cunningham; second to Consolidation No. 32, Owings, captained by Victor Null; and third to Federal No. 1 mine, Koppers Coal Co., Grant Town, of which Bud Powell was captain. In the colored division, first honors were taken by a team from Federal No. 1 headed by Neil Morrison.

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Personal Notes

W. H. COOKE has been appointed general manager of the Chafin Jones Heatherman Coal Co., Peach Creek, W. Va.

T. B. DRYER, superintendent of the Acmar mine of the Alabama Fuel & Iron Co., Acmar, Ala., has been appointed by Governor Dixon as a member of the mine examining board, Division of Safety Inspection, Alabama Department of Public Relations, filling a vacancy caused by resignation.

S. H. EDEBURN has been appointed assistant superintendent at Kempton No. 42 mine of the Davis Coal & Coke Co., Garrett County, Maryland, vice A. D. KING, mine foreman. LEON STEYER has been made mine foreman, succeeding CARL LUZIER, assistant mine foreman.

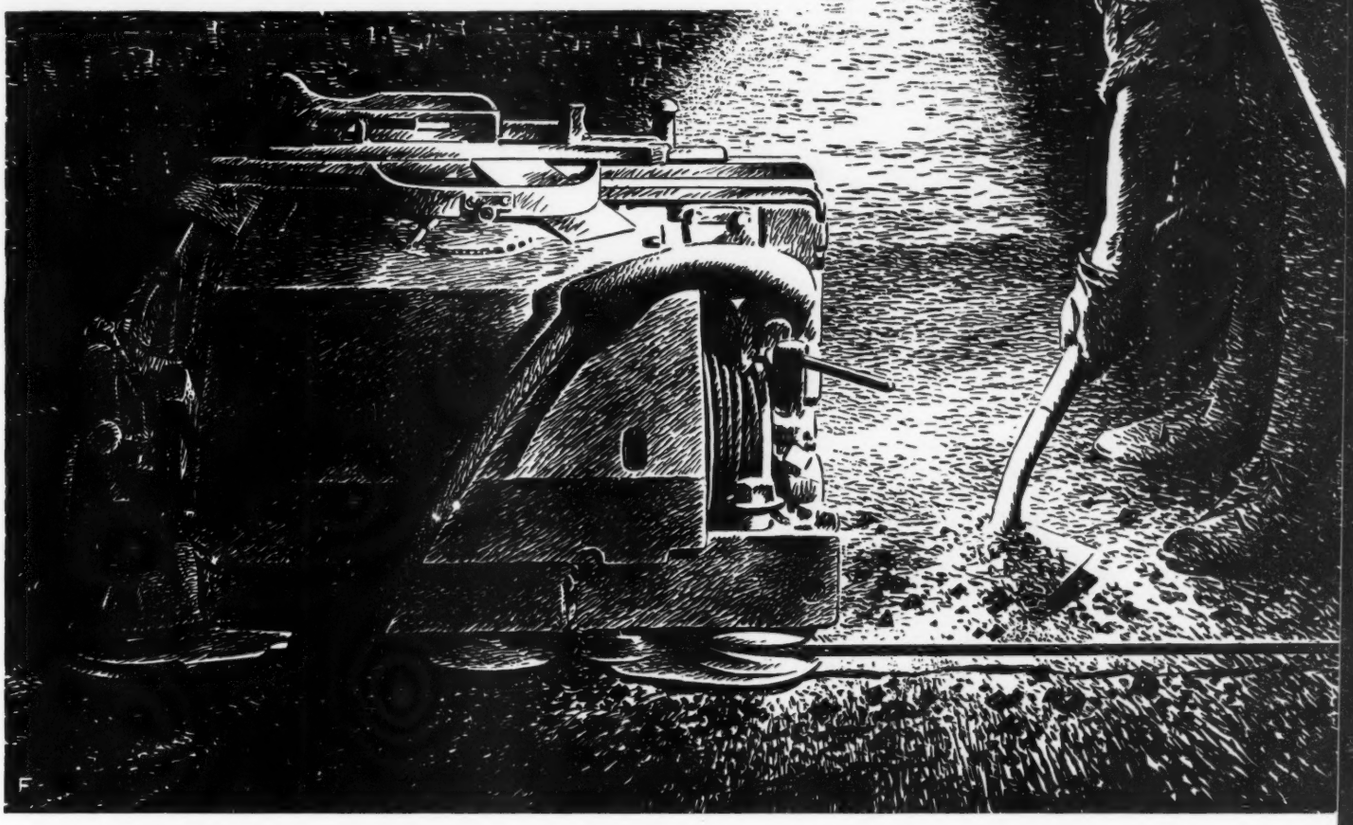
V. GABANEY has been named mine foreman at Stirrat No. 19 mine of the West Virginia Coal & Coke Corporation, Stirrat, W. Va.

J. T. HILL has been appointed sales

Best of the white teams at Jackson's Mill

Left to right, front row—Lowell Kelly, Frank Cunningham (captain), Tony Larry and R. L. Stalnaker; rear row—F. H. Brooks (superintendent, Mine No. 86), Raymond Barber, Jim Morris and William Bazuk.

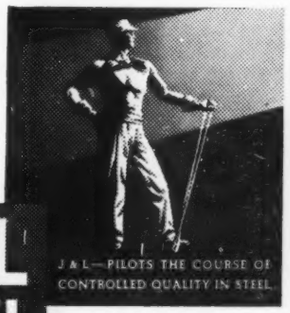
THERE'S ECONOMY FOR YOU -SAFETY FOR YOUR MINERS--WHEN YOU USE J&L *Precisionbilt* GILMORE MINING ROPES



Nine thousand tons of coal per day — and every ton dependent upon the safe, efficient performance of wire rope — to dig it — to convey it — to load it. Whether you mine coal, or any other mineral, in any quantity, you can depend upon J & L Precisionbilt Mining Ropes to keep your operations working safely — efficiently — economically.

All Precisionbilt Ropes are made of J & L Controlled Quality (CQ) Steel — on precision machinery of the most advanced design — by experienced men who work with the understanding that human life may depend upon every rope they make.

J & L Precisionbilt Mining Ropes have the strength, abrasion-resistance and extra safety factor to give you long, economical service. When you need wire rope for any mining purpose, specify J & L Precisionbilt. Write today for our catalog.



JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

GILMORE WIRE ROPE DIVISION
PITTSBURGH, PENNSYLVANIA

J&L STEEL

J&L PARTNER IN PROGRESS TO AMERICAN INDUSTRY

Thomas Moses

mine foreman by the Chafin Jones Heatherman Coal Co., Peach Creek, W. Va.

C. E. JONES has been made assistant manager of the Sheridan-Wyoming Coal Co., Monarch, Wyo., vice Paul L. Shields, resigned.

J. W. JONES has been appointed assistant mine foreman at Stirrat No. 19 mine of the West Virginia Coal & Coke Corporation, Stirrat, W. Va.

THOMAS MOSES, vice-president in charge of raw materials of the United States Steel Corporation of Delaware, retired on Aug. 19, having reached the corporation's retirement age of 70; he will continue, however, in a consulting capacity. Mr. Moses began his business career at the age of eleven as a trapper boy in an Indiana coal mine, continuing in the industry for 57 years. In 1927 he became president of the various coal-mining subsidiaries of United States Steel, being made vice-president in charge of raw materials and also a director and member of the executive committee in December, 1937, when his son, Harry M. Moses, was made head of the coal units.

F. WITCHER MCCULLOUGH, formerly secretary of the National Bituminous Coal Commission, has been appointed assistant to John L. Davin, vice-president of the Chesapeake & Ohio Railway Co. His headquarters will be in Huntington, W. Va.

A. B. MCELVANY, lately traffic manager of the Rochester & Pittsburgh Coal Co., Indiana, Pa., has been engaged as assistant to the president of the United Eastern Coal Sales Corporation, Charles O'Neill, with offices in New York City. Mr. McElvany was employed by the National Coal Association soon after its formation, remaining for several years, when he became head of the Western Pennsylvania Coal Traffic Bureau.

F. F. JORGENSON has been appointed manager of operations for the Monongahela Rail & River Coal Corporation, Fairmont, W. Va. He recently resigned as assistant general manager of operations of the Consolidation Coal Co.

W. T. RUSSELL has been named chief engineer by the Chafin Jones Heatherman Coal Co., Peach Creek, W. Va.

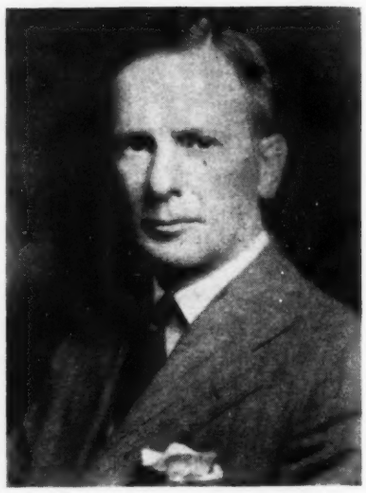
PAUL L. SHIELDS has been appointed assistant general manager of the United States Fuel Co., Salt Lake City, Utah.

R. L. SMYTH, for a number of years with the Logan Coal Co. and later with Barnes & Tucker and the Johnstown Coal & Coke Co., has become associated with the Eastern division of the Koppers Coal Co. with offices in New York City.

HOWARD J. THOMAS, general superintendent, Cane Creek Mining Co., Bankhead, Ala., has been named by Governor Dixon to membership on the mine examining board, Division of Safety Inspection, Alabama Department of Public Relations, succeeding a member who resigned.

J. P. WILLIAMS, JR., who has been president of the Koppers Coal Co. since 1931, has been made president of the Koppers Co., vice J. T. TIERNEY, who has been named chairman of the board. Mr. Williams also will serve as executive vice-president of Koppers United Co.

A. F. WINTERS has been made superintendent of the Chafin Jones Heatherman Coal Co., Peach Creek, W. Va.

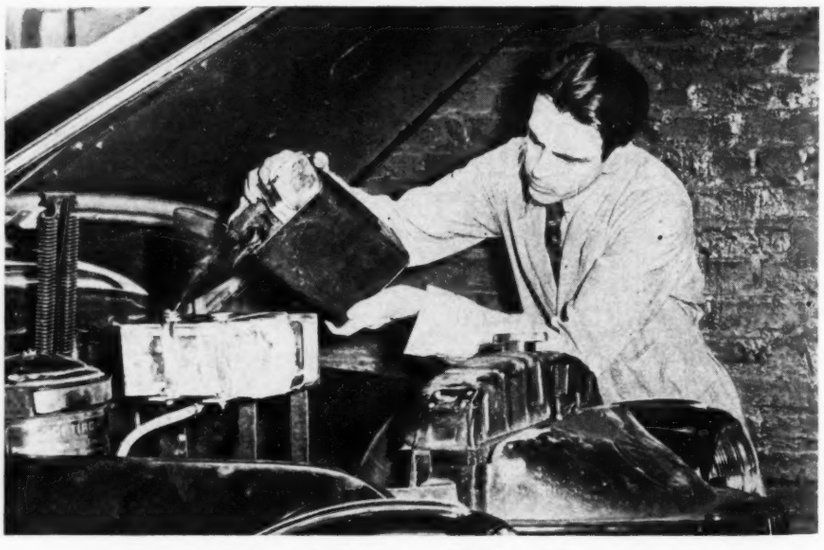


J. P. Williams, Jr.

Fifth Mine Safety Conference Attracts World Notables

Representatives in the field of mine safety research from Great Britain, France, Belgium, Germany and Poland as well as the United States have signified their intention of attending the Fifth International Conference on Mine Safety, to be held Sept. 25-30 at the Pittsburgh (Pa.) Experiment Station of the U. S. Bureau of Mines. Invitations were extended to directors of experiment stations in the leading coal-producing countries by John W. Finch, Director, U. S. Bureau of Mines. Local committee members include H. P. Greenwald (chairman), J. J. Forbes, G. W. Jones, H. H. Schrenk and J. C. Ilsley, of the Pittsburgh station.

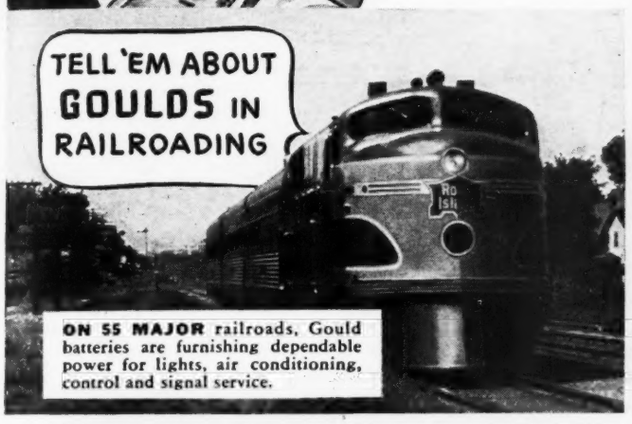
Among those who will attend and present papers are: Dr. R. V. Wheeler, director of research, British Safety in Mines Research Board, and his assistant, Dr. F. V. Tideswell; E. Audibert, director of the testing station of the Central Committee of Coal Mine Owners, Montlucon, and M. Blum-Picard, Director of Mines, Paris, France; Adolphe Breyre, director of the testing station of the National Institute of Mines, Paturages, Belgium, and his assistant, F. van Oudenhove; H. Schultze-Rhonof, director of research, mining experiment station, Dortmund-Derne, Germany; M. Stanislaw Herman, director, and Dr. W. Cybulski, acting director, Barbara Experimental



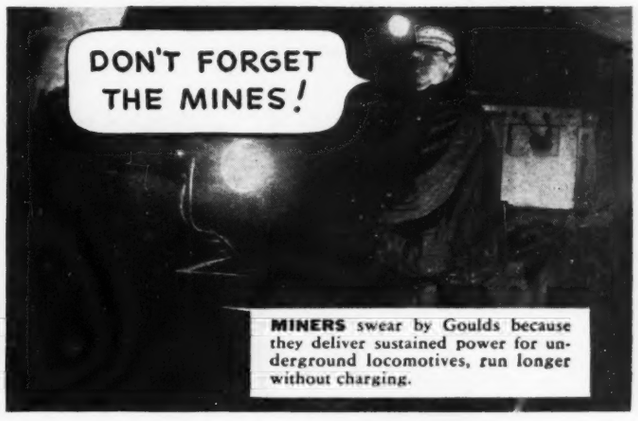
Drives Stock Model Car With "Liquid Coal"

Exhibiting the possibilities of "liquid coal," scientists of Armour Institute of Technology showed on June 17 how it is possible to drive a 1939 stock model automobile on coal. This development in research is credited to Dr. Francis W. Godwin, director of the Coal Research Division of the Research Foundation of Armour Institute. The demonstration took place on Randolph St., Chicago, in the presence of newspaper men, scientists, and coal producers and dealers. The test was made without changes of any kind in the ignition system of the motor, with the exception of one fine-screen filter. According to Dr. Godwin, the demonstration was made with the use of a very light oil, or a form of range oil with a light fraction of hydrocarbon, as the vehicle, followed by special treatment with the coal, resulting in the suspension of coal of about 500-mesh. The automobile was started on gasoline and, after smooth running conditions had been attained and the motor had come up to driving heat, the fuel system was changed so that the gasoline supply was cut off and the "liquid coal" introduced in the carburetor. Thereafter the engine ran on liquid coal.

"HOW WOULD YOU ADVERTISE GOULD BATTERIES?" asked the inquiring reporter... Here are some of the answers he got..



ON 55 MAJOR railroads, Gould batteries are furnishing dependable power for lights, air conditioning, control and signal service.



MINERS swear by Goulds because they deliver sustained power for underground locomotives, run longer without charging.

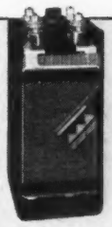
ON MANY a big telephone system, it's Gould that provides the power to carry your voice from here to there.

NOTHING like it since the stars were made—the 200 inch reflector telescope at Palomar. Goulds were picked to operate focusing machinery.

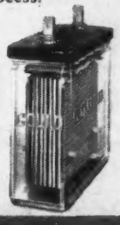
ELEVATORS controlled by Goulds lift salmon and steelhead over Bonneville Dam to upper river. (And 70 utility systems use Goulds.)

"EVERY INDUSTRY HAS A GOOD WORD FOR GOULD BATTERIES"

GOULD PLANTE: *Guaranteed 14 years* in floating service. Maximum life with highest sustained capacity under all operating conditions made possible by exclusive one-piece pure lead spun plate process.



GOULD KATHANODE: *Guaranteed from 4 to 12 years.* Spun Glass construction provides long life, light weight and high capacity at low operating cost. For all motive power and railroad applications.



GOULD DREADNAUGHT *Guaranteed from 2 to 8 years.* Maximum capacity and long life when pasted plate construction for low initial cost is of primary importance.

NOTE: KATHANODE and DREADNAUGHT batteries are available in either Glass Jar or Hard Rubber construction.

FREE illustrated manuals describing any of these exclusive Gould constructions are yours upon request. Write: Gould Storage Battery Corporation, Depew, N. Y.

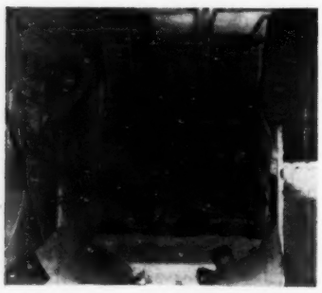
GOULD

Why tipple designers are specifying SIMPLICITY gyrating coal screens

The days when 3 carpenters and a coal man would build a complete tipple are long past. Tipple designing today requires years of training and experience. In short, good tipple designers have to know their stuff. Thus we feel that the best testimony we can give about Simplicity gyrating coal screens is the fact that the country's leading designers are specifying them.

These engineers know that because of their rubber cushioned mountings, Simplicity screens offer freedom from frame vibration. They know that because of their roller bearings and counter-balanced shaft they insure faster screening speed. They know that because of their sturdy construction their maintenance and depreciation costs are low.

A 3'x 6' Simplicity single deck gyrating coal screen on a portable truck in a retail coal yard.



A Simplicity 4'x 8' single deck screen handling mine run coal and screening at the rate of 2100 pounds in 20 seconds in the tipple of a Michigan coal mine.

Whether you consult an outside engineer or your own, you will find that Simplicity units will help you to maintain your production at the lowest cost per ton. Write today for our free catalog on Simplicity gyrating coal screens.

Simplicity

ENGINEERING COMPANY · DURAND MICH.

Coming Meetings

• American Chemical Society, Division of Industrial and Engineering Chemistry: autumn meeting, Sept. 11-15, Boston, Mass.

• American Coal Distributors' Association: annual meeting, Sept. 21–23, French Lick Springs, Ind.

• West Virginia Coal Conference: Sept. 28–30, School of Mines, West Virginia University, Morgantown.

• Joint meeting of Coal Division of American Institute of Mining and Metallurgical Engineers and Fuels Division of American Society of Mechanical Engineers: Oct. 5–7, Deshler-Wallick Hotel, Columbus, Ohio.

• Lehigh Valley Section of American Institute of Electrical Engineers: Oct. 11–13, Hotel Casey, Scranton, Pa.

• National Safety Council: 28th safety congress, Oct. 16–20, Atlantic City, N. J.

• National Coal Association: Seventeenth convention, Oct. 23–25, Roosevelt Hotel, New York City.

• Illinois Mining Institute: 47th annual meeting, Nov. 10, Hotel Abraham Lincoln, Springfield, Ill.

Coal Mine and Central Experiment Station, Mikolow, Poland.

Subjects to be discussed at the conference include: explosibility of coal dust and methods of preventing air dustiness in working places; testing of electrical equipment for safety in mines; ignition of gaseous mixtures by explosives; sheathed explosives; testing of diesel mine locomotives for safety; fundamentals of the combustion of methane; and the design of gas masks and respirators for mining uses.

One day of the conference (Sept. 27) and a subscription dinner in the evening will be devoted to topics of general interest and will be open to the public. The other meetings, however, will be limited to participants in the conference. Several afternoons will be given over to inspection tours.

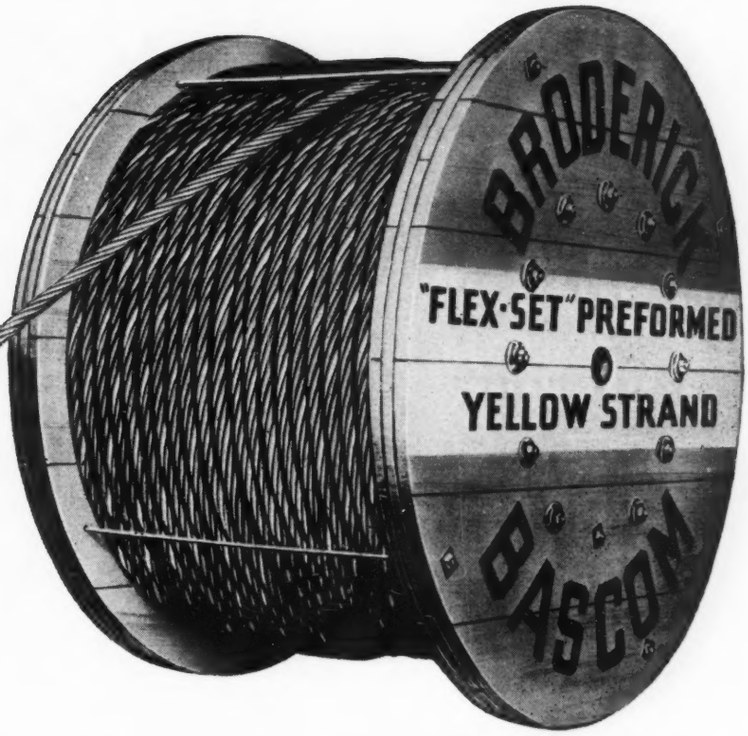
This series of conferences began in 1931 at Buxton, England, followed by those at Montlucon, France, 1933; Dortmund-Derne, Germany, 1935, and Brussels and Paturages, Belgium, 1937.

New Preparation Facilities

BLUE BIRD COAL CO., Blue Bird mine, Carrier Mills, Ill.: Contract closed with Morrow Mfg. Co. for Morrow-Prins washer, refuse conveyor, sludge conveyor, settling tank, etc.; capacity, 100 tons per hour of 3x¼-in. coal.

BLUE DIAMOND COAL CO., Mayflower mine, Bonny Blue, Va.: Contract closed with Morrow Mfg. Co. for stoker-coal plant equipped with conveyors, vibrating screens, hoppers and chutes; capacity, 300 tons per hour of 2-in.x0 coal.

CULGUN COAL CO., mine near Richmond, Ohio: Contract closed with Morrow Mfg. Co. for feeder, shaking screens and loa



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St. Louis, Seattle, Peoria.

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New York, Chicago, Seattle, Portland, Houston.

Distributors:
Everywhere.

A Coal Handler for 63 Years

From the time this company was formed, in 1876, Broderick & Bascom ropes have been constant coal handlers. Starting to work in the soft coal fields of Illinois their use rapidly extended throughout the country.

Today, "Flex-Set" Preformed Yellow Strand is the super coal handler. Made of specially drawn wire, with wires and strands permanently shaped during manufacture to the helical form they occupy in the finished rope, it is limp and tractable—practically pre-broken in.

"Flex-Set" Preformed Yellow Strand is easily and quickly installed, and highly resistant to kinking, fatigue, drum crushing. All this means true economy. Try it!

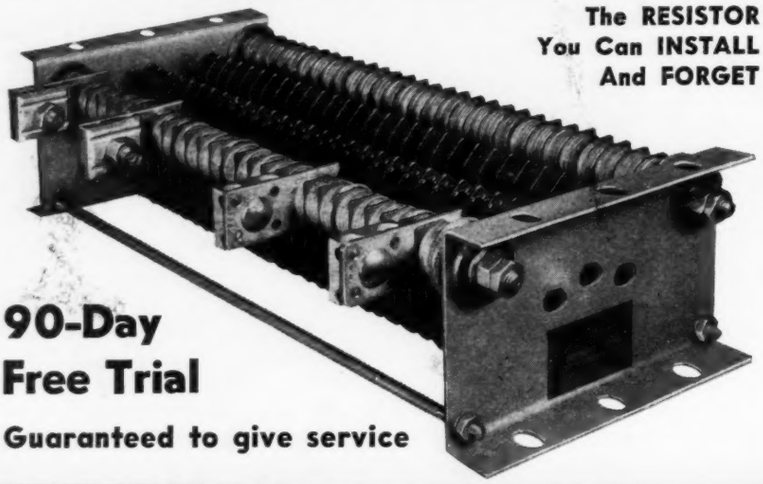
Broderick & Bascom Rope Co. • St. Louis

"Flex-Set" Preformed YELLOW STRAND

Cut Operating Costs With Continuous Production

P-G Steel Grid Resistors do Just That—Ruggedly built to carry overloads—Without hot spot burn outs—Unharmed by either vibration or corrosion—Consistency in keeping equipment in production long ago earned for P-G the title

The RESISTOR You Can INSTALL And FORGET



90-Day Free Trial

Guaranteed to give service

THE POST-GLOVER ELECTRIC CO.
• ESTABLISHED 1892 •
221 WEST THIRD STREET, CINCINNATI, OHIO

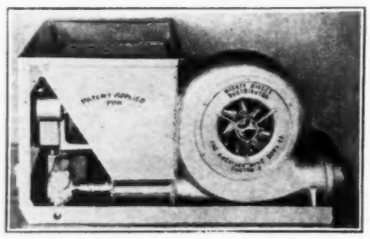
***WOULD YOU RISK YOUR LIFE FOR* $500?**

Many Men in the Coal Industry are Doing it When They Refuse to Rockdust Their Mines.

ONE MORE IN KENTUCKY RECENTLY

MIGHTY MIDGET ROCKDUSTER

Does not cost $500, and will protect your Corporate life and the lives of your workmen.



Capacity 39 lb. per min. Will distribute, including lost time, 2040 pounds per hour.

More than 7 tons a shift.

In back entry work or air courses where the machine can be hauled or dragged, it will show a better performance and lower cost than machines costing seven times as much. Many other types and sizes to choose from in both non-permissible and permissible machines. A liberal trade-in allowance given on the Midget for larger machine. Ask for demonstration. Send for catalogue.

THE AMERICAN MINE DOOR CO., 2057 Dueber Ave., Canton, Ohio

ing boom; capacity, 75 tons per hour of mine-run.

FAIRMONT & BALTIMORE COAL & COKE CO., Willard mine, Shinnston, W. Va.: Contract closed with Fairmont Machinery Co. for primary shaker screens, vibrating screen for stoker coal, loading booms and conveying equipment; capacity, 250 tons per hour of mine-run.

INDEPENDENT COAL & COKE CO., Kenilworth, Utah: Contract closed with McNally-Pittsburg Mfg. Corporation for addition of rescreening plant and blending bins to handle 120 tons per hour of 1⅝-in.x0 coal to produce 1⅝x1-in., 1-in.x0, 1x 3/16-in. and 3/16-in.x0; to be completed in October.

KENT COAL MINING CO., Kent mine No. 4, Coal Run, Pa.: Contract closed with Hevl & Patterson, Inc., for tipple and equipment for dumping, crushing, screening and loading on three tracks plus 2-in. lump, 2x¾-in. egg and ¾-in.x0 slack; capacity, 300 tons per hour of mine-run.

GEORGE E. MILLER COAL CO., Joller, Pa.: Contract closed with Heyl & Patterson, Inc., for steel tipple, dump, feeder, crusher, elevator, screens, and 120-ton steel storage bins for sized coal; plant designed to load both mine-run and sized coal into railroad cars and motor trucks; to be completed in October.

MONTANA COAL & IRON CO., Washoe, Mont.: Contract closed with Jeffrey Mfg. Co. for Jeffrey unit washer composed of diaphragm jig, dewatering screens and sludge-reclaiming equipment to treat 4x ½-in. coal; capacity, 50 tons per hour; to be completed about Oct. 15.

OLD BEN COAL CORPORATION, mine No. 14, Buckner, Ill.: Contract closed with American Coal Cleaning Corporation for 5x18-ft. "Twin-Dex" pneumatic separator and auxiliary equipment to treat 70 tons per hour of ¾x5/16-in. raw coal input; to be completed in September.

PENNSYLVANIA COAL & COKE CORPORATION, Moss Creek collieries Nos. 21 and 22, Garman, Pa.: Contract closed with Fairmont Machinery Co. for complete three-track tipple and cleaning plant; tipple to be equipped with sizing screens and loading booms; cleaning plant to embody use of Chance sand flotation system; mine-run capacity, 300 tons per hour; cleaning-plant capacity, 200 tons per hour.

RADIANT FUEL CORPORATION, coke plant, West Frankfort, Ill.: Contract closed with American Coal Cleaning Corporation for one Type "Y" size R-60x100 American pneumatic separator, American metallic dust-collecting system and auxiliary equipment to treat 20 tons per hour of 5/16-in.x0 raw coal input; to be completed in September.

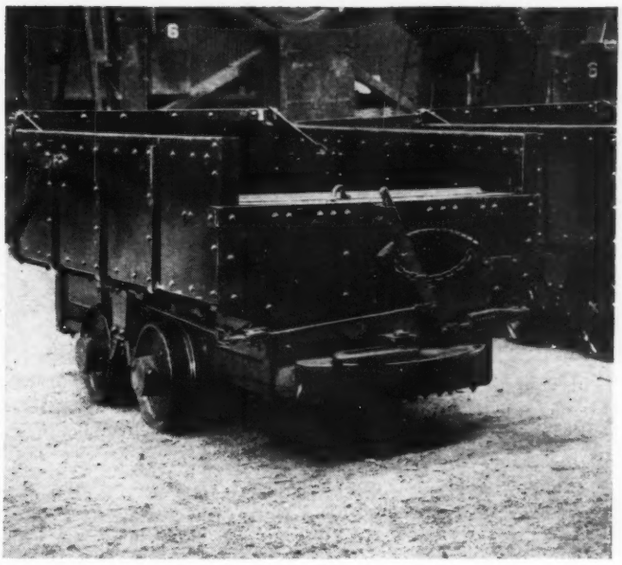
REITZ COAL CO., Central City, Pa.: Contract closed with Jeffrey Mfg. Co. for complete tipple including dump hopper, feeder, conveyors, shaking screens, loading booms, crusher, vibrating screens and mixing conveyor; will load 1¼x0-, 2x1¼- and 2-in. lump or ¾x0-, 2x¾- and 2-in. lump; capacity, 300 tons per hour; to be completed about Jan. 1, 1940.

WYOMING MINING CORPORATION, mine at Lower Road Branch, Wyoming Coun-

MAYARI R

PRONOUNCED MY'A-REE

Reduces dead weight in mine car construction



Mayari R is a high-strength, low-alloy steel that permits definite and sizable reductions in dead weight

HIGH YIELD POINT

With Mayari R's yield point of 50,000 p.s.i. min. (about twice that of mild carbon steel), designers can cut dead weights up to 50 per cent, depending on design and application.

MAYARI R IS A PRACTICAL STEEL

Reducing weight on a practical basis calls for an unusual combination of properties in the steel. Mayari R has these properties:

Workability: Mayari R can be worked like mild carbon steel, by the usual shop methods and the regular staff, with only minor allowances for its greater strength.

Weldability: All the usual gas and electric methods can be used with Mayari R. Neither the weld nor the adjacent metal air hardens, so that heat treatment is not required.

Corrosion Resistance: The life of Mayari R is indicated as five to six times that of mild carbon steel. This important feature protects the life of the thinner members made possible by Mayari's greater strength.

Impact and Abrasion Resistance: Mayari R has considerably better resistance to shock or impact than mild carbon steels at either normal or subzero temperatures and has excellent abrasion resistance.

Not Air Hardening: Mayari R does not air harden in rapid cooling; consequently, formed sections do not require heat treatment after forming.

Usable "As Received": Mayari R has the desired strength and ductility as it comes from the mill and is used without heat treatment.

Available in Usual Forms: All the usual products—sheets, strip, structural shapes, plates, bars and cold formed sections—are available in Mayari R. Designers can secure unity in design with increased economy by utilizing the various forms.

Low Costs: The appreciable saving in weight with Mayari R renders the finished-job cost practically equal to that of ordinary steel.

CATALOG ON REQUEST

A catalog describing Mayari R will be sent on request. We will also be glad to confer with you in order that you may obtain the greatest usefulness with Mayari R.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

Presenting
THE BROWNIE
OIL SPRAY SYSTEM

High Pressure Atomizing Eliminates Pre-Heating!

Spray oil—the most satisfactory material yet developed for dedusting coal—is applied without the necessity of heating.

The Brown-Fayro *"cold oil"* system is based on the use of high pressure pump, with a buried storage tank and circulating loop to keep conditions uniform at the spray points. Impact type nozzles completely atomize the oil at pressures of 300 to 600 pounds per square inch.

With low pressure pumps it is necessary to heat the oil before it can be atomized, but the heat is rapidly dissipated in the spray and the oil is at air temperature when it reaches the coal.

The expense and fire hazard of heating equipment, unavoidable with low pressure pumps, are eliminated when The Brown-Fayro cold oil system is used.

WRITE TODAY—

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MINE CARS & WHEELS
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THE BROWN-FAYRO COMPANY
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ty, West Virginia: Contract closed with Morrow Mfg. Co. for four-track tipple equipped with shaking screens, conveyors, loading booms, etc.; capacity, 250 tons per hour of mine-run.

Five-Man Board Named To Probe NLRB

Speaker Bankhead of the House of Representatives has named a five-man board to investigate the National Labor Relations Board. Representative Howard Smith (D., Va.), author of the resolution authorizing the inquiry to determine what amendments were needed to make the Wagner Labor Relations Act airtight, was named chairman of the committee. The other members are: Representatives Arthur D. Healey (D., Mass.), Abe Murdock (D., Utah), Charles A. Halleck (R., Ind.) and Harry N. Routzohn (R., Ohio). Mr. Healey is co-author of the Walsh-Healey public contracts act.

In adopting the resolution the House instructed the committee to make an investigation along these lines:

"1—Whether the National Labor Relations Board has been fair and impartial in its conduct, in its decisions, in its interpretation of the law (particularly with respect to the definition of the term 'interstate commerce'), and in its dealings between different labor organizations and its dealings between employer and employee.

"2—What effect, if any, the National Labor Relations Act has had upon increasing or decreasing disputes between employer and employees; upon increasing or decreasing employment and upon the general economic condition of the country.

"3—What amendments, if any, are desirable to the National Labor Relations Act in order to more effectively carry out the intent of Congress, bring about better relations between labor unions and between employer and employee, and what changes, if any, are desirable in the personnel of those charged with the administration of said law.

"4—Whether the National Labor Relations Board has by interpretation or regulation attempted to write into said act intents and purposes not justified by the language of the act.

"5—Whether or not Congress should by legislation further define and clarify the meaning of the term 'interstate commerce.'

"The committee shall recommend to the Congress such changes as they deem desirable in the act or in the personnel of those administering the act, and shall report and recommend such legislation either by way of amendments to existing law or by way of new legislation, as they may deem desirable."

John A. Garcia Passes

John A. Garcia, head of the well-known engineering and construction firm of Allen & Garcia Co., Chicago, died Aug. 11. Following his graduation from the Missouri School of Mines and Metallurgy in 1900, he spent three years in metal mining, chemical work and railroad construction. He definitely cast his lot with coal

John A. Garcia

mining in 1903, when he became mining engineer with the mining department of the Missouri Pacific R.R. He then became successively chief engineer for the Rock Island Coal Mining Co. in what was then Indian Territory, Consolidated Coal Co. of St. Louis, Dering Coal Co., Burnwell Coal Co. and Consolidated Indiana Coal Co.

With the formation of the Allen & Garcia Co., with the late Andrews Allen, he became prominently identified with the design and construction of many outstanding coal-mining properties throughout the country.

West Virginia Coal Conference Draws Industry Leaders

The annual West Virginia Coal Conference, sponsored for several years by West Virginia University through its School of Mines, will be held Sept. 28–30 at Morgantown, according to President Charles E. Lawall of the university. Secretary of the Interior Ickes, Governor Holt and Assistant Secretary of War Louis A. Johnson are among those listed as speakers in the tentative program. Presiding at the various sessions will be Truman E. Johnson, secretary, Northern West Virginia Coal Association; D. C. Kennedy, secretary, Kanawha Coal Operators' Association; John T. Snyder, general manager, West Virginia Coal & Coke Corporation; Hal M. Scott, secretary, Winding Gulf Coal Operators' Association, and Harry M. Moses, president, United States Coal & Coke Co.

Papers to be presented are as follows: "Commercializing Education," W. E. E. Koepler, secretary, Pocahontas Coal Operators' Association; "Products From Coal," James K. Hunt, E. I. duPont de Nemours & Co., Inc.; "Importance of Geology to the Future of the Coal Industry," David B. Reger, consulting geologist; "Use Classification of Coal," T. W. Harris, Jr., E. I. duPont de Nemours & Co., Inc.; "New Problems in Preparation and Sizing of Coal," P. C. Thomas, vice-president, Koppers Coal Co.; "Domestic Consumer Education," John Fielding, Jr., Hanna Coal Co.; "Coal Industry—Character—Economics," James D. Francis, pres-

ident, Island Creek Coal Co.; "Business Man's Need for Coal Research," James Walter Carter, president, Carter Coal Co.; "Thermostatic Control of Heating Equipment," W. B. Hughes, manager, stoker division, Butler Mfg. Co.; "Coal's Importance to the Railroads," J. E. Tobey, manager, fuel engineering division, Appalachian Coals, Inc.; "Coal, the Permanent Source of Power," C. B. Huntress, assistant sales manager, Republic Coal Corporation; "Coal, the Cheapest Source of Power," W. A. Buckhannon, Appalachian Power Co.

Secretary Ickes is scheduled to speak at the concluding session, with "Fair Trade Practice" as his subject. A luncheon session will be presided over by A. C. Spurr, president, Monongahela West Penn Public Service Co. At the annual banquet, Jesse V. Sullivan, secretary, West Virginia Coal Operators' Association, will serve as toastmaster, and Governor Holt will be the principal speaker.

Various Aspects of Safety To Be Discussed

Viewpoints and aims in safety will receive consideration in the Mining Section program of the 28th National Safety Congress, to be held Oct. 16-20 at the Ambassador Hotel, Atlantic City, N. J. In addition to addresses by General Chairman L. C. Campbell, assistant to the president, Koppers Coal Co., and Donald B. Gillies, vice-president, Republic Steel Corporation, and president, American Institute of Mining and Metallurgical Engineers, the following papers will be presented:

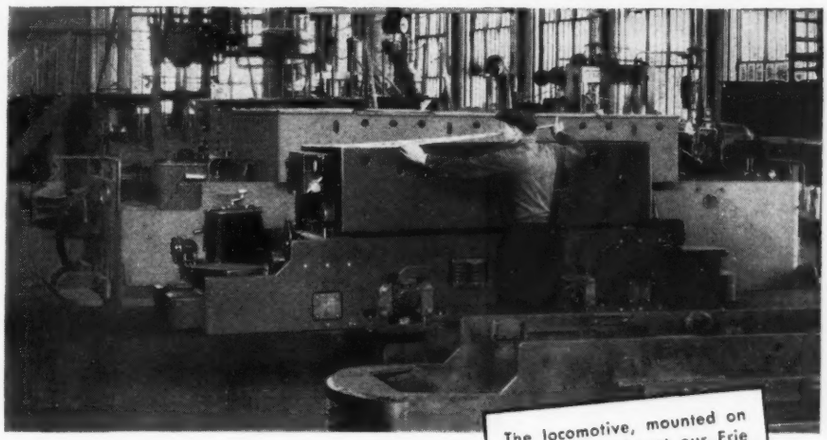
"Safety Problems Faced in Bituminous Coal Mining," Heath Clark, president, Rochester & Pittsburgh Coal Co.; "Safety Problems Faced in Anthracite Coal Mining," Cadwallader Evans, Jr., vice-president, Hudson Coal Co.; "Federal Aim in Mine Safety," John W. Finch, Director, U. S. Bureau of Mines; "State of Pennsylvania Aim in Coal-Mining Safety," John I. Thomas, State Secretary of Mines. There also will be discussion and a question box for suggestions for review of 1939 program and expansion of Mining Section safety activities for 1940. The chairman of the entertainment committee is J. T. Ryan, president, Mine Safety Appliances Co.

Welding Courses at W.V.U.

Cooperating with the vocational division of the State Department of Education and the institution's department of mechanical engineering, the School of Mines at West Virginia University, Morgantown, is offering short courses in electric and oxyacetylene welding. Groups of ten men are enrolled for the courses, each of which covers a period of eight weeks. The term now in progress began July 10 and will extend until Sept. 2, when a new course will be organized.

Prof. W. A. Staab, of the School of Mines, says 44 hours each week is devoted to actual welding practice together with some related technical instruction in the properties of materials and the science of welding. The group meets

United States Gypsum Co.'s New Battery Locomotive Is a Thrifty Power Consumer



The locomotive, mounted on assembly blocks, at our Erie Works. Back of it is a 20-ton battery locomotive for hauling railroad cars

THIS new 4-ton G-E battery locomotive has gone into service in the United States Gypsum Company's mine at Gypsum, Ohio. It is used in gathering work.

Its two 6-hp motors are units of a line of G-E motors specially designed for battery operation—motors that reach a new high in efficiency, which is extremely important where every fraction of added motor efficiency means added dollars saved in battery charging. Their high-torque-per-ampere characteristics minimize dangerous drains on the battery at heavy loads.

The box holding the 48-cell battery rolls on tracks and can be pulled to the side for exchange or for easy inspection and for work on either the battery or the equipment located beneath it. Seats have been provided for a rider on both ends of the locomotive.

In addition to storage-battery locomotives, General Electric builds trolley and combination types in various sizes and embodying special features to meet practically any mine-haulage requirements. Back of this is 52 years' experience in building mine locomotives. It's at your service for your next units. General Electric Co., Schenectady, New York.

DATA

Weight—4 tons
Drawbar pull—1000 pounds
Voltage—85 volts
Track gage—36 inches
Wheelbase—40 inches
Length—138 inches
Width—56 inches
Height—47 inches
Control—drum type

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GENERAL ELECTRIC

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Improved design adds strength *with* lightness; improved machinery in our new plant insures utmost precision; experienced craftsmanship and rigid inspection eliminates the menace of hidden weakness.

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daily from 8 a.m. to 5 p.m. No educational requirements are set up and no college credit is awarded, the object being to train qualified welders. The equipment includes various types of oxyacetylene torches and four standard welding outfits made by different manufacturers.

Independent Hard-Coal Men Seek Stabilization

Aiming at stabilization of the anthracite industry, which they consider possible and desirable, about fifty independent operators met Aug. 11 at Wilkes-Barre, Pa., and effected a permanent organization, electing as president A. C. Dodson, of Weston Dodson & Co., Inc. Following the election of the president a nine-man board was named, as follows: Wyoming-Lackawanna district—W. S. Jermyn, Jermyn-Green Coal Co.; Willard Burrus, Penn Anthracite Collieries Co.; John J. McDade, Heidelberg Coal Co. Lehigh district—H. D. Kynor, Coxe Bros. & Co.; Donald Markle, Jeddo-Highland Coal Co.; R. F. Deumler, Cranberry Improvement Co. Schuylkill district—James Pierce, East Bear Ridge Colliery Co.; Harold Smith, St. Clair Coal Co.; Byron H. Sleppy, Stevens Coal Co.

In the course of the meeting it was planned to meet with representatives of the old line companies with a view to perfecting arrangements mutually advantageous to both groups.

Obituary

JUDSON F. WEBB, 57, chief mining engineer, Alabama By-Products Corporation, Birmingham, Ala., died July 26 in a Birmingham hospital. He had been connected for 35 years with the Pratt Consolidated Coal Co. and Alabama By-Products, with which it was merged.

WILL MCFARLIN, 64, who for many years had been prominent in the coal industry in Alabama, died July 19 in Birmingham after a short illness. At the time of his death he was vice-president of the Warrior Stone & Contract Co. He was the father of Carl McFarlin, president, Tennessee Products Corporation.

DUNCAN SINCLAIR, 86, formerly a notable figure in the coal industry, died July 23 in Fairmont, W. Va. Joining the New Central Coal Co. in 1875, he remained with the company more than fifty years, directing the development of its Baxter mine at Rivesville.

RICHARD GILBERT, secretary-treasurer of District 2, United Mine Workers, died Aug. 13 at his home in Clearfield, Pa. He had held that office nearly forty years, being one of the pioneers of the U.M.W.

CARL LAGER, 70, president of Morris Machine Works, Baldwinsville, N. Y., and a noted designer of pumping machinery, steam engines and hydraulic dredges, died July 17 at his summer home in the Adirondacks. He had been ill for two years, his death being hastened by a stroke.

FRED W. GERTEL, 48, a pit boss and joint operator of the Bauser Coal Co., Bunker Hill, Ill., was fatally crushed Aug. 21 when pinned by a rock fall.

Chilean Coal Mine to Use Belt Conveyors

Surface and underground belt conveyors will be installed by the Compania Carbonifera de Fundicion Schwager, Coronel, Chile, to handle an ultimate capacity of 300 tons per hour of 14-in. maximum dry mine-run coal from an undersea mine to a preparation plant. A contract for the installation was closed by H. Von Thaden, vice-president, Robins Conveying Belt Co., during a recent Chilean trip. The system will consist of eight 36-in.-wide belt conveyors approximating a distance of 2¼ miles. Conveyors 1 and 2 from the rotary car tippler to the foot of the inclined underground drift will be 4,300 and 970 ft. long, respectively. A series of five belt conveyors will handle the coal about a mile to the mouth of the mine. A surface conveyor, approximately 1,550 ft. long, will take the coal from the mine mouth to the preparation plant.

Kingston Pocahontas Resumes Under Union Agreement

Operations were resumed at four operations of the Kingston Pocahontas Coal Co. in Fayette, McDowell and Mercer counties, West Virginia, late in July following an agreement reached on July 21 with the United Mine Workers. G. E. Brandon, general manager of the company, said the agreement did not involve acceptance of the closed shop. William Blizzard, vice-president of District 17, U.M.W., termed the contract "satisfactory" and embodying the wage and hour provisions of the Appalachian agreement except for the penalty clause.

Mines of the company, which is a subsidiary of the Semet-Solvay Co., had been closed down since April 1, the company refusing to sign the "union ship" agreement reached in New York on May 13. Negotiations had been in progress since then. About 2,200 miners are affected.

Employees of the McKell Coal & Coke Co., with operations in Fayette and Raleigh counties, have returned to work at two of the company's mines, under protection of State police, without a union agreement.

New Tipple at Willard Mines

A new tipple is being constructed at the Willard mines of the Fairmont & Baltimore Coal & Coke Co., Shinnston, W. Va. The equipment includes loading booms, shaker and vibratory screens, and a crusher. When construction has been completed it will be possible to load lump, egg, stoker, pea and slack; operation was scheduled to begin late in August.

Stokers Tops in Chicago

Permits for the installation of fuel-burning equipment issued by the Department of Smoke Inspection and Abatement of Chicago totaled 188 for May and June, according to Frank A. Chambers, chief smoke inspector. Commercial and industrial size underfeed stokers led by a wide margin with 131 installations,

compared to 29 oil burners, 2 gas burners, 2 combination oil and gas burners, and 15 hand-fired installations under fuel agreements. Several permits also were issued for spreader-type stokers. These permits do not include house-heating installations or apartment buildings containing less than six flats.

Coal Mine Reproduced At Golden Gate Fair

Visitors to the Golden Gate International Exposition, on Treasure Island, in San Francisco Bay, California, are able to see first-hand how the interior of a mine actually looks. In Treasure Mountain, covering one entire end of the Building of Mines, Metals and Machinery, spectators may journey through shafts and tunnels and see some of the many formations found in the coal, copper, gold and silver mines of the West.

A section of a coal mine with an authentic reproduction of a bituminous coal seam, such as is found in Washington, Utah, Colorado, Wyoming, Montana or New Mexico is presented. An adjoining chamber exhibits a small blower with canvas pipe ventilating a mine face. Near by is an explosives magazine and a primer room, where fuses used in blasting are cut to proper length and where explosive caps are crimped on their ends.

Battle to Discuss Coal

An open forum discussion of the coal industry will feature the 42d regular meeting of the Allegheny Regional Advisory Board, to be held Sept. 14 at the Fort Stanwix Hotel, Johnstown, Pa. John D. Battle, executive secretary, National Coal Association, will be the principal speaker.

Permissible Plate Issued

One approval of permissible equipment was issued by the U. S. Bureau of Mines in July, as follows:

Joy Manufacturing Co.: Type 42D2 shuttle car (storage-battery operated); three 2-hp. motors, 90 volts, d.c.; Approval 376; July 28.

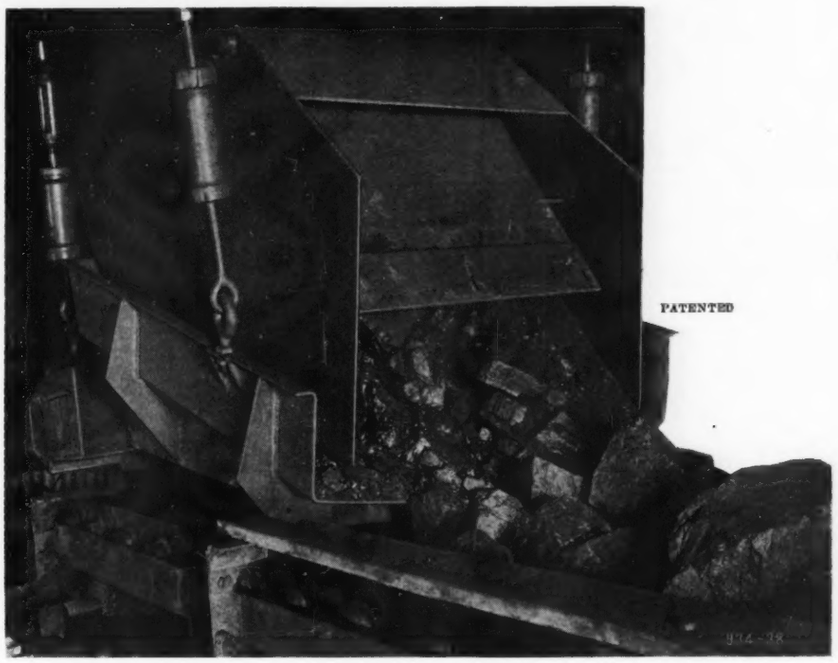
Broadwell Colliery to Resume

Preparations for resuming operations at the Broadwell colliery, Moosic, Pa., had been nearly completed early in the second week of August. J. Giotte and J. Genini have leased the property from the Kehoe-Berge Coal Co., which had originally leased it from the Lehigh Valley Coal Co. but abandoned it in September, 1937. Under the new management, the coal is to be prepared for market in the Kehoe-Berge breaker.

To Stage Coal-Dust Blast

A coal-dust explosion is to be staged in connection with the Labor Day celebration by southern Colorado miners to be held Sept. 4 at Walsenburg, Colo. Myron Williams, deputy State coal-mine inspec-

No Traffic Congestion WITH CONTROLLED FEED



Above—Jeffrey-Traylor electric vibrating feeder discharging coal to steel apron conveyor, the latter being used as an inspection table with high picking capacity. One man can pick as high as 50 tons per day. Bulletin No. 686 describes Jeffrey Inspection Tables.

On many highways automobile congestion is becoming a serious problem. If this traffic could be controlled as easily and accurately as the feeding of materials with Jeffrey-Traylor electric vibrating feeders, the problem would be solved.

Jeffrey-Traylor feeders *do provide positive control over tonnages* and feed at a fixed rate which can be changed at will. Types and sizes of decks vary as does capacity — depending upon kind of material and conditions.

Power unit may be floor mounted or suspended, and no vibration is transmitted to surrounding structure or adjacent equipment. Very little power is required to operate J-T feeders and there is nothing to get out of order or to require lubrication. Maintenance, of course, is unusually low.

J-T feeders are often used for discharging run-of-mine coal to scale cars in tipples where the expense of a cleaning plant is not justified, or where coal is to be accurately weighed as it is fed.

Investigate Jeffrey-Traylor feeders, if you desire controlled feed.

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calls for operating efficiency all along the line. These specialists in various phases of mine operation can aid you materially in determining quick, economical solutions to your mining problems, that make for more efficient operation, resulting in lower costs and a consequent greater return on your investment. Consult them!

tor stationed at Walsenburg, is working with Bureau of Mines officials to stage the blast in front of the grandstand at the fair grounds. It is planned to show the dangers of coal dust and how rescue squads, equipped with breathing apparatus, enter a gas-filled chamber and rescue victims.

Search for New Uses for Anthracite to Begin

Actual work in the quest for new uses for anthracite will start in September at Pennsylvania State College, according to John Ira Thomas, State Secretary of Mines. The program, financed by $35,000 in Commonwealth funds and an equal amount subscribed by coal producers, will coincide with the opening of the college term, when six research authorities who have done some work on bituminous possibilities will turn their attention to hard coal.

An important factor in the study, said Secretary Thomas, will be research into the manufacture of stokers to improve methods of handling anthracite in order to compete with fuel oil. Use of hard coal for water filtration also will be examined in the laboratory. "This is the sort of thing that should have been done 20 or 25 years ago," said Secretary Thomas; "but better late than never."

A supervising committee has been named which includes: James J. Walsh, Deputy Secretary of Mines; Donald Markle, president, Jeddo-Highland Coal Co.; Edward Weichel, assistant general manager, Hudson Coal Co.; Frank C. Wright, Jr., vice-president, Philadelphia & Reading Coal & Iron Co.; Martin Brennan, president, District 9, United Mine Workers; Dr. H. J. Rose, senior anthracite fellow, Mellon Institute, and Dr. Homer G. Turner, Anthracite Institute.

Miners Vote Against UMW

Miners at the Big Jim Coal Co., near Pineville, Ky., on July 29 voted 50 to 32 against the United Mine Workers as the sole bargaining agent with the company. The vote was ordered by the National Labor Relations Board. The mine has been operating on an open-shop basis.

Industrial Notes

HERCULES POWDER CO. has named R. W. McKee as acting manager of its Birmingham (Ala.) office, following the death of J. J. Grimes, manager for the last 21 years.

WHITNEY CHAIN & MFG. CO. announces that J. W. Anderson, its Dallas (Texas) representative, has opened an office at 902 Allen Building.

R. G. LETOURNEAU has opened a new factory, 400x400 ft., on a 2,000-acre tract near Toccoa, Ga. The new road-machinery plant will be known as the LeTourneau Co. of Georgia.

LINK-BELT SPEEDER CORPORATION has been organized by the Link-Belt Co. as a wholly owned subsidiary but to be oper-

ated independently, with headquarters in Chicago. This is a consolidation of the Speeder Machinery Corporation, Cedar Rapids, Iowa, and the Shovel Division of Link-Belt Co. T. M. Deal is president of the new organization, which will manufacture and sell power-operated excavating and materials handling shovels, draglines and cranes.

BUCYRUS-ERIE CO. has appointed Clarence L. Boyd Co., Guthrie and Oklahoma City, as distributor for the State of Oklahoma.

WEBSTER MFG., INC., has appointed Fessler & Co. as sales agent in the Pittsburgh (Pa.) territory.

GENERAL ELECTRIC CO. has appointed G. R. Prout as manager of sales of industrial control, and W. T. Darcy as manager of sales of renewal parts.

WOOD PRESERVING CORPORATION, a Koppers Co. subsidiary, has transferred H. R. Condon, vice-president, from its Philadelphia office to the Pittsburgh general office. He was formerly in charge of the corporation's Eastern division.

AUSTIN-WESTERN ROAD MACHINERY CO. announces executive changes in connection with plans for additional buildings and consolidation of manufacturing facilities at Aurora, Ill., as follows: Vice-President F. L. Jerome has been made assistant to the president; Vice-President H. M. Kleiser has been placed in charge of sales, advertising, service and research; R. K. Stiles has been made sales manager.

THOMAS LAUGHLIN CO., has appointed D. W. Huff as general sales manager with headquarters in Portland, Me.

CUTLER-HAMMER, INC., has appointed B. M. Horter as general sales manager.

GOODMAN MFG. CO. has elected William E. Goodman president, vice Charles H. Strawbridge, deceased. Loyal F. Crawford and Arthur C. Green, sales manager, have been elected vice-presidents.

AIR REDUCTION SALES CO., New York City, has appointed J. T. Gillespie, Jr., as assistant to Thomas P. Hasler, president of the Wilson Welder & Metals Co., Inc., an affiliate of AIRCO.

ROOTS-CONNERSVILLE BLOWER CORPORATION has named the following territorial representatives of its turbine-pump division: Colby Equipment Co., Indianapolis, for southern Indiana; Lewis P. Heaven, Kansas City, Mo., for western Missouri and all of Kansas; Coblentz Equipment Co., Erie, northwestern counties of Pennsylvania; Allan T. Shepherd Co., Richmond, for Virginia.

INDEPENDENT PNEUMATIC TOOL CO. has opened a branch office at 1544 Broadway, Denver, Colo., in charge of C. A. Turnquist.

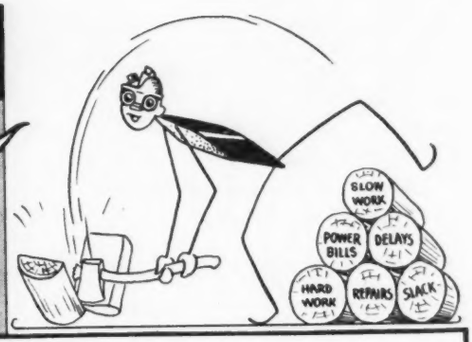
STEWART-WARNER CORPORATION has appointed Joseph C. Elliff to an executive sales position, working out of the office of the vice-president and general sales manager.

BUELL ENGINEERING CO. and B. F. STURTEVANT CO., complementary organizations, have completed arrangements whereby the field organization of the

JIM SLIM says:

WE GIVE LABOR
(and the boss, too)
A REAL 'BREAK' . . .

ME AND BOWDIL
CUTTER BARS*



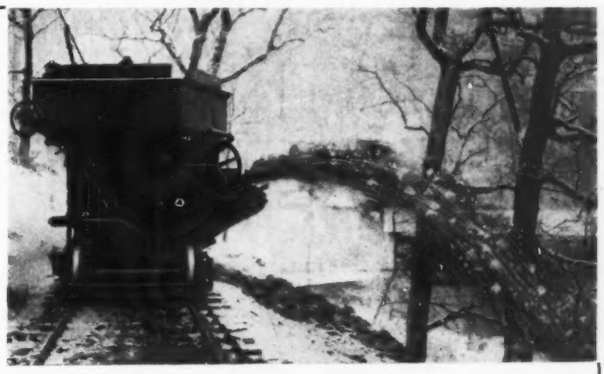
*". . . and by a 'break', we mean more than just a day off! We make the job of cutting coal a whale of a sight easier the whole year 'round because, being thinner, we're lighter, faster, and easier to operate. To the boss this means less power, bigger production, and less waste . . . and because we hardly ever get 'winded', we also save him plenty on replacements. If he happens to be reading this, I hope he'll write The Bowdil Company, Canton, Ohio for details."

Jim Slim

BOWDIL

COAL CUTTING EQUIPMENT

4th Repeat Order for



ROCK DISPOSAL CARS

A large coal company has just equipped its *fourth* mine with cars designed and built by Heyl & Patterson for rock disposal.

Such repeat orders are just one evidence of the service that Heyl & Patterson equipment is performing in coal operations. Whether a complete tipple or a single accessory to modernize existing equipment, you will find this organization ready to bring to your problem a distinctive combination of design, fabrication and erection service.

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latter will parallel the work of the service staff of the former, thus providing service for both dust or fly-ash equipment and fan equipment from a single source.

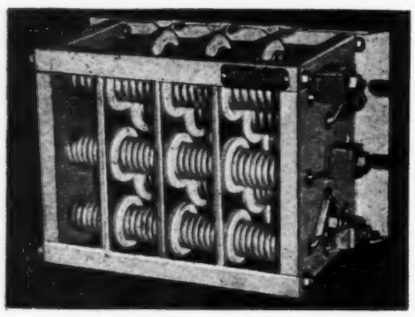
Denial of Harlan Injunction Upheld by Higher Court

The Court of Appeals at Frankfort, Ky., sustained on July 25 the refusal of the Harlan Circuit Court to enjoin fourteen southeastern Kentucky coal companies from signing "closed shop" contracts with the United Mine Workers (*Coal Age*, August, p. 77). In an opinion by Judge Thomas the court said counsel for the eight plaintiff non-union miners who sought a temporary injunction "do not rely on any statutory enactment in support of their position, if indeed it would be competent for the Legislature to so prescribe, nor in any case cited sustain the theory that a private commercial contract, or a determination on part of one of the parties, that only certain classes of persons will be employed invades any principle of public policy.

"It will be perceived, however," said the opinion, "that the plaintiffs' predicament, as so disastrously predicted, is bottomed exclusively on their determination that they will not join the union so as to qualify themselves for employment under the contract. Nowhere is it claimed that any of the plaintiffs are under any contractual obligation against their employer entering into any such contract. They therefore do not seek to enforce any contractual rights."

RESISTANCE

... that stands the gaff!



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GUYAN MACHINERY COMPANY

LOGAN, WEST VIRGINIA

Trade Literature

AIR COMPRESSORS—Ingersoll-Rand Co., New York City. Leaflet Form 2437 describes Type 20 vertical stationary two-stage high-pressure air compressors for starting internal-combustion engines. Design features are cited, with table of performances and dimensions.

AMPLIFIER SYSTEMS—Webster Co., Chicago. Catalog 139 describes features of the company's line, giving equipment, specifications and applications.

BALL-BEARING FLANGE UNITS, ETC.—Stephens-Adamson Mfg. Co., Aurora, Ill. Catalog 739 features Sealmaster ball-bearing pillow blocks, flange units and take-up units, giving sectional views, dimensions and other data.

BELT DATA—Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc., Passaic, N. J. Data book for machine designers and engineers designing V-Belt drives covers standard drives, eliminating the necessity of working out calculations; sheave factors for designing new or special drives; also belt comparison tables and other general information.

CAR AND BARGE HAULER—Robins Conveying Belt Co., New York City. Bulletin No. 106 points out the salient features of Robins Mead-Morrison haulage systems, giving layouts, specifications and foundation plans.

COMPRESSORS—Chicago Pneumatic Tool Co., New York City. Supplement "B" to Bulletin No. 726 cites salient features of Class O-CTE horizontal tandem duplex motor-driven compressors, giving details of construction, sectional and installation views.

DIESEL TRACTOR—Caterpillar Tractor Co., Peoria, Ill. Form 5403 discusses specifications and mechanical features of the "Caterpillar" D6 unit, with cut-away illustrations and explanatory captions.

DRAFTING FOIL—Ozalid Corporation, New York City. Bulletin Form OZ-171 gives general description and lists outstanding features of Ozalid light-sensitive foil, which can be handled in daylight with dry development.

EARTH-MOVING EQUIPMENT—R. G. LeTourneau, Inc., Peoria, Ill. Bulletin Form G-1023 explains and pictures angledozers and bulldozers for work in a wide variety of material under a wide variety of conditions. Forms SC-134 and 135 describe by word and pictures how carryalls handle jobs from start to finish with controlled results in all kinds of weather.

Mine Accident Fatality Rate Registers Decrease

Accidents at coal mines in the United States caused the deaths of 55 bituminous and 8 anthracite miners in June last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors. With a production of 28,500,000 tons, the death rate among bituminous miners was 1.93 per million tons, compared with 2.58 in the corresponding month of last year.

The anthracite fatality rate in June last was 2.27, based on an output of 3,531,000 tons, against 6.29 in June, 1938.

For the two industries combined, the death rate from accidents in June last was 1.97, compared with 3.19 a year ago.

Fatalities during June last, by causes and States, as well as comparable rates for the first six months of 1938 and 1939, are shown below:

UNITED STATES COAL-MINE FATALITIES IN JUNE, 1939 BY CAUSES AND STATES

	Underground						Open-Cut and Surface					
State	Falls of Roof	Falls of Face	Haulage	Electricity	Machinery	Total Underground	Railway Cars	Falls of Persons	Electricity	Other Causes	Total Surface	Grand Total
Alabama	1	....	1	....	....	2	....	....	....	....	....	2
Colorado	....	1	....	....	....	1	....	....	....	....	....	1
Illinois	1	....	2	....	....	3	1	1	....	....	2	5
Indiana	3	....	1	....	....	4	....	....	....	....	....	4
Kentucky	4	....	2	....	....	6	....	....	....	....	....	6
Ohio	1	....	....	....	....	1	....	....	....	1	1	2
Pennsylvania (bit.)	10	....	2	1	1	14	....	....	....	....	....	14
Tennessee	1	....	....	....	....	1	....	....	....	....	....	1
Virginia	1	....	....	....	....	1	....	....	....	....	....	1
West Virginia	11	....	4	1	1	17	....	....	1	....	1	18
Wyoming	....	....	1	....	....	1	....	....	....	....	....	1
Total (bituminous)	33	1	13	2	2	51	1	1	1	1	4	55
Pennsylvania (anthracite)	1	2	3	....	....	6	....	....	....	2	2	8
Grand Total	34	3	16	2	2	57	1	1	1	3	6	63

FATALITIES AND DEATH RATES AT UNITED STATES COAL MINES, BY CAUSES*

January–June, 1938 and 1939

	Bituminous				Anthracite				Total			
	Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons	
Cause	1938	1939	1938	1939	1938	1939	1938	1939	1938	1939	1938	1939
Underground:												
Falls of roof and coal	218	188	1.447	1.161	73	60	2.934	2.258	291	248	1.658	1.316
Haulage	60	57	.398	.352	14	11	.563	.414	74	68	.422	.361
Gas or dust explosions:												
Local	13	3	.086	.019	1	...	.040	.....	14	3	.080	.016
Major	60	...	.398	.....	18	...	.724	.....	78	...	.444	.....
Explosives	11	5	.073	.031	7	10	.281	.376	18	15	.103	.079
Electricity	20	18	.133	.111	2	1	.080	.038	22	19	.125	.101
Machinery	10	9	.067	.056	...	...	.....	.....	10	9	.057	.048
Shaft	3	2	.020	.012	2	4	.080	.151	5	6	.028	.032
Miscellaneous	8	4	.053	.025	5	7	.201	.263	13	11	.074	.058
Stripping or open-cut	1	3	.007	.019	8	3	.322	.113	9	6	.052	.032
Surface	17	11	.113	.068	5	10	.201	.376	22	21	.125	.112
Total	421	300	2.795	1.854	135	106	5.426	3.989	556	406	3.168	2.155

* All figures subject to revision.

ELECTRICAL EQUIPMENT — Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin B6012 describes complete line of vertical-lift metal-clad switchgear for control of generators, motors, incoming lines, feeders, bus-tie circuits, etc., showing newest safety features and including dimension sheets and circuit diagrams. Bulletin B6011 covers indoor cubicle-type switchgear, giving installation views, dimension sheets and wiring diagrams, as well as application and construction data. Bulletin B6010 gives dimensions and applications of a.c. and d.c. motors, with list prices.

ELECTRICAL EQUIPMENT—General Electric Co., Schenectady, N. Y., has released the following bulletins: GEA-2080—CR-9503 a.c. and d.c. solenoids. GEA-2420—Capacitor-motors: what they are; why used. GEA-2426B—Oil-blast circuit breakers, Type FLO. GEA-2596A—Metal-inclosed switchgear. GEA-3085A—Spirakore distribution transformers, single-phase oil-immersed. GEA-3071A—Diesel-electric industrial locomotives.

EYE PROTECTION—American Optical Co., Southbridge, Mass. Booklet entitled "Eyes Are Expensive Targets" contains information concerning the cost and causes of eye accidents, with ideas about putting into operation a plan for eliminating the causes and lowering the cost.

FINE GRINDER—Stephens-Adamson Mfg. Co., Aurora, Ill. Catalog No. 639 contains dimensions, capacities and installation data on the Mosley mill, in which dry materials pulverize themselves by attrition as a powerful current of air sweeps them around the grinding chamber. A section is devoted to their use for pulverizing and burning coal in small and medium-size industrial boilers.

IRON VALVES—Jenkins Bros., New York City. Booklet Form 183, entitled the "Inside Story," analyzes the factors of valve life and maintenance, showing how sizable savings in repair and replacement can be effected at no extra cost. Included is a handy reference chart giving types, sizes and figure numbers for ordering.

LINE MATERIALS—Ohio Brass Co., Mansfield, Ohio. Catalog 22 (160 pp.), covering mining and industrial equipment, includes porcelain insulators, feeder and trolley materials, catenary materials, control devices, locomotive equipment, rail bonds and automatic couplers. Bulletin 680-H discusses the problem of protecting stations from lightning, tells what objectives were sought in the design of O-B control gaps, explains how these devices work, points out where they can be installed to best advantage, and gives complete catalog information.

LUBRICANTS—E. F. Houghton & Co., Philodelphia, Pa. Bulletin gives helpful hints on electric-motor lubrication, with specimen questions and answers.

LUBRICANTS—Sun Oil Co., Philadelphia, Pa. Form A-714 depicts by word and picture the wide application of Sun Oil lubricants, giving recommendations for locomotives, mine cars, conveyors, car dumps, mining machinery, ventilating fans, etc.

MAGNET WIRE AND COILS—Anaconda Wire & Cable Co., New York City. Publication No. C-352 is a new and revised edition of the company's wire catalog and handbook, giving increased information, including electrical and physical properties, sizes, current-carrying capacity, etc.

MANGANESE STEELS — American Manganese Steel Division, American Brake Shoe & Foundry Co., Chicago Heights, Ill. Catalog No. 59 tells what manganese steel is, covering origin, physical properties and why it resists impact and abrasion; gives information on plant and research facilities, and method of manufacture; and illustrates many of its uses.

MECHANICAL RUBBER GOODS—Manhattan Rubber Mfg. Division, Passaic, N. J. Condensed catalog describes hundreds of mechanical rubber products and special items with emphasis on belting, hose, packing, molded rubber goods, industrial asbestos friction material, rubber roll coverings, tank linings and abrasive wheels.

MOTORPUMP—Ingersoll-Rand Co., New York City. Folder Form 1917 shows construction details of a unit designed for all types of general service, built in sizes for delivery of 5-1,000 gal. per minute and heads up to 500 ft.

PAPER PULLEYS—Rockwood Mfg. Co., Indianapolis, Ind. Booklet No. 860 covers all types of paper pulleys for industrial use, giving complete list of stock sizes and prices.

PIPE- AND BOLT-THREADING EQUIPMENT —Oster Mfg. Co., Cleveland, Ohio. Catalog No. 39-A describes and illustrates threading tools and machines, giving time studies, threading speeds, specifications.

POWER TRANSMISSION—Morse Chain Co., Ithaca, N. Y. Bulletin 75 covers new Morse roller and silent chain drives, describing types, design, etc. Other products featured are clutches and couplings.

PUMP-PRIMING EQUIPMENT — DeLaval Steam Turbine Co., Trenton, N. J. Leaflet SP-1 decribes automatic submerged suction priming equipment for centrifugal pumps, explaining its operation and summarizing its advantages.

RERAILERS—Edelbute Mfg Co., Reynoldsville, Pa. Bulletin 121 succinctly describes features of the Anchor unit, giving directions for use.

ROAD MACHINERY — Austin-Western Road Machinery Co., Aurora, Ill. General catalog briefly describes the company's line, emphasizing the Model 99 grader, new 6- and 8-yd. scrapers, Patrol sweeper and Badger shovel.

RUBBER BELTING—United States Rubber Co., New York City. Bulletin Form M 9332, "Belting Biographies," describes the company's complete line of transmission and conveyor belts, giving case histories, depicting installations in various industries, including mining. Included are data on the selection of the proper belt, installation, speed of operation, pulley size, tension, carrying capacity, etc., as well as numerous types of transmission drives and conveyor layouts, together with suggestions for improving belting methods.

SCREENING—W. S. Tyler Co., Cleveland, Ohio. Bulletin 908 describes the Hummer and Tyler-Niagara methods of wet screening, with a number of Tyler screens illustrated.

SCREENS—Robins conveying Belt Co., New York City. Bulletin No. 105 describes and illustrates Vibrex screens, Styles H and J, summarizing their features and advantages.

STEEL PRODUCTS FOR MINE USE—United States Steel Corporation. Catalog Form No. 15425 lists and illustrates in detail the various types of products manufactured for mine-car use by the corporation, including rails and joint bars, steel mine ties and fastenings; switches, turnouts, frogs and crossings; mine timbers, posts and jacks; data on the use of Corten and Man-Ten in mine cars; information on mine locomotive, industrial, car and sheave wheels; fencing, wire rope and electrical wires, power bonds and cable, etc.

STEEL—Joseph T. Ryerson & Son, Inc., Chicago. Bulletin cites qualities of Stressproof Steel No. 2, described as a non-warping shafting and machinery steel combining high strength, free machinability and wearability. Stock list and data book covers many new products and sizes added to the company's line, giving weights, length, cutting data and other pertinent information of interest to the steel user.

SYNCHRONOUS MOTORS AND GENERATORS —General Electric Co., Schenectady, N. Y. Bulletin GEA-137D points out briefly features of Type TS low-speed synchronous motors. Bulletin GEA-1960A similarly treats Types ATB and ATI low-speed synchronous generators.

VARI-SPEED CONTROLS—Columbia Vari-Speed Co., Wheaton, Ill. Bulletin cites features of JFS-Jr. units, describing operations and illustrating typical installations.

VERTICAL CONTACTS — Cutler-Hammer, Inc., Milwaukee, Wis. Booklet entitled "Dust, the Destroyer," informs users of motor control about the advantages of vertical contacts in eliminating dust as a cause of burned, pitted, sticky contacts.

WIRE ROPE—Macwhyte Co., Kenosha, Wis. Booklet entitled "Life Hangs by a Thread" shows the wide range of uses for wire rope and pictures dramatically various steps in its manufacture. Leaflet tells how sheave materials affect wire-rope service, illustrations showing frequent sources of trouble.

WORM GEARS—DeLaval Steam Turbine Co., Trenton, N. J. Leaflet E-1175 points out the advantages of worm-gear drive in the way of simplicity; smooth, silent operation; uniform and positive flow of power, standardization of electric motor speeds, economy in floor space, safety to attendants, and high efficiency; specifications also are given and standard forms of such gears described.

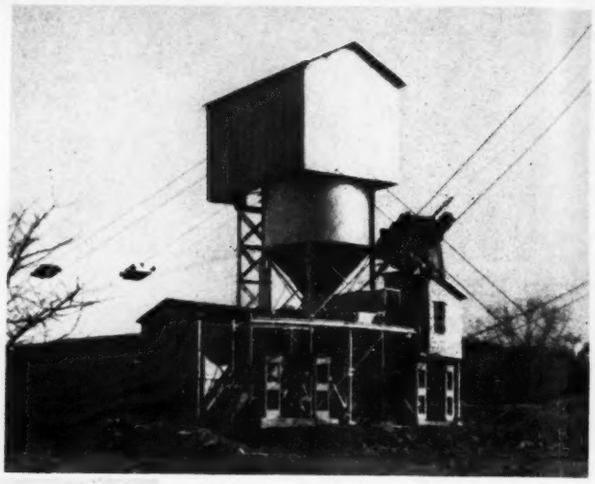
Glen Alden Solves its Disposal Problem for the Next 30 Years

with an

INTERSTATE

the first

Aerial Disposal Plant in the Anthracite Region



Transfer Terminal of Mine Refuse Disposal System, Ashley, Pa., Showing Continuous Carrier Conveyor Type Tramway and Two Carrier Self-Dumping Disposal Type, with Travelling Automatic Batch Loader. This installation was described in August COAL AGE and reprints of that article may be obtained from us on request.

The problem at the Glen Alden Coal Company's Huber Preparation Plant, near Wilkes-Barre, was disposal of mine rock and breaker waste beyond the city streets of Ashley Borough, 25 tracks of the C. R. R. of N. J. and 2 tracks of the Lehigh Valley R. R.

Following several notable installations in bituminous mines, Glen Alden installed an INTERSTATE Automatic Aerial Tramway System to do this work, minimum hourly capacity 125 tons. The tramway system will normally operate 10 to 12 hours daily, breaker refuse being calculated at 600 tons, plus 300 to 400 tons of mine rock. It is estimated that two piles, each containing 40 million cu.ft. may be dumped, enough to provide for 30 years total refuse. One man operates the entire system.

Here is data YOU want to study

Mine refuse disposal by Interstate Automatic Aerial Tramways. Photos, diagrams, capacity-tables for different types of tramways, etc. If you have any disposal problems within this field, INTERSTATE ENGINEERS are at your service to work with you toward their solution.

Special Features of INTERSTATE Disposal Tramways

1 Large capacity carriers supported by six wheels, travelling on two cables forming one track.
2 Original design of self-dumping cars with adjustable door tripping mechanism arranged to discharge cars in motion.
3 Strongly built carriers of corrosion and acid resistant alloys.
4 Tramway drive drums with integral helical steel gears and high torque pneumatic and hydraulic brakes.
5 Simple and effective arrangement of brake mechanism.
6 Automatic loading with self-closing gates.
7 Automatic loading with batch weigh hoppers and motor driven feeders functioning under electric control.
8 Travelling weigh hoppers to load tramcars at points remote from tipple bins.
9 All steel construction of terminal and tower supports.
10 Towers of pivoted base design for automatic adjustment of track cable tensions under varying load conditions.

INTERSTATE EQUIPMENT CORPORATION

ELIZABETH, N. J. NEW YORK, N. Y.

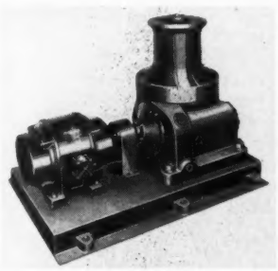
WHAT'S NEW

In Coal-Mining Equipment

CAR SPOTTERS

Link-Belt Co., Chicago, has developed two new vertical-capstan electric car spotters, designated as No. 5-A and No. 10-A, respectively capable of 5,000 lb. rope pull or moving one to three cars, and 10,000 lb. rope pull or capacity to move three to six cars, depending upon track conditions, whether level, on grade, straight, or curved.

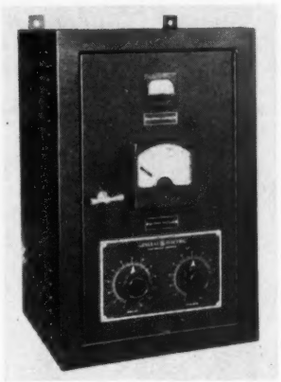
The new machines employ a high-torque electric motor of user's choice, connected to spotter drive mechanism by an incased flexible roller chain coupling, and mounted, with the spotter, on a welded-steel baseplate. The vertical capstan, made of semi-steel or cast steel, is machine-finished to prolong the life of the haul-



age cable. A strong housing completely incloses and protects the gearing. A ratchet and pawl are furnished when required, mounted inside the capstan, for holding cars on an incline when the power is off. The No. 5-A is equipped with 5-hp. motor; the No. 10-A requires a 10-hp. motor.

BATTERY CHARGER

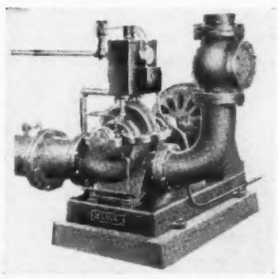
A new completely automatic and self-regulating electronic battery charger, called the Phano-Charger, has been developed by General Electric Co., Schenectady, N. Y., for charging and maintaining storage batteries used in substations and other places for standby service, control power, and emergency lighting. By



using industrial-type metal phanotron rectifier tubes, says the manufacturer, moving parts are eliminated, thus assuring long life for the equipment and practically silent operation. The chargers are available in three sizes: 4.5 and 12.5 amp. to operate from a single-phase power supply, and 25 amp. to operate from a three-phase a.c. supply.

PRIMING EQUIPMENT FOR CENTRIFUGAL PUMPS

DeLaval Steam Turbine Co., Trenton, N. J., has introduced a submerged-suction priming system for centrifugal pumps which, according to the manufacturer, maintains the pump full of water at all times, whether running or standing, just as if the pump were located below the supply, and provides for continuously removing any reasonable amount of inleakage. The pump can, it is said, be started and



stopped, either manually or automatically, without danger of injury or running dry, or can, when desired, be drained for inspection or repair.

The water level on the suction side of the pump is automatically lifted above the eye of the impeller and continuously held there, just as if the pump were located below the supply. Merely by breaking the vacuum which maintains the elevated suction level the pump can be drained completely and opened for upkeep and maintenance, without further complication.

HOLE SAWS

A new line of high-speed hole saws has been placed on the market by the Black & Decker Mfg. Co., Towson, Md. These units are used in ½-in.

or larger electric drills to increase their capacity for cutting clean round holes in any material a hack saw will cut. Of particular interest to many users, according to the manufacturer, is a new mandrel for ¼- and ⅜-in. drills which can be used to drive hole saws up to ½ in. in diameter.

LOW-TYPE CONTROLLER

Bemeco low-type controllers, offered by the Beckley Machine & Electric Co., Beckley, W. Va., are designed particularly for mine service, where height is an important factor. To eliminate burning of the switch by opening it under heavy current, these units are provided with an automatic interlocking device which prevents hand-operated transfer switches from being changed when the controller has been opened to the first point.

When automatic transfer switches are used, the controller can be so wired that the reel will operate only when the motors are in series or only when in parallel. Also the controller can be made to operate the reel when the motors are in series going in one direction and parallel going in the opposite direction.

EARTH-MOVING EQUIPMENT

A new 2-cu.yd. power shovel, the 44-B, is being offered by Bucyrus-Erie Co., South Milwaukee, Wis. Available with gasoline, diesel or electric power, the unit can be converted for use as shovel, dragline, clamshell or crane. A new type chain crowd has been incorporated which, according to the manufacturer, will provide powerful crowd-out and high speed retract. Crowd, hoist and swing are synchronized to give maximum output in all kinds of digging. A

light, strong front end affords wide working ranges, and big sheaves increase rope life and provide favorable digging angles. The dipper is equipped with Beco Tiger teeth made of tough forged tool steel, which are both reversible and replaceable.

Bucyrus-Erie H-74 2-wheel scrapers, bullgraders and bulldozers are now available in models specially designed for use with the International TD-18 TracTracTor. It dumps backward and behind its wheels, like a truck. A simple low-pressure hydraulic system controls the position for dig-

ADVERTISING PAGES REMOVED

ging, hauling and dumping.

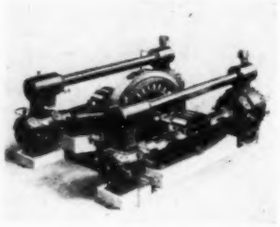
A larger size bullgrader and bulldozer also can be had. The bullgrader will sidecast to either side; the blade also can be tilted to either side for cutting down banks, ditching, etc. The hydraulic control valve is placed conveniently, permitting positive and quick adjustment of the blade while the tractor is in motion.

HIGH-SPEED COUNTING BY ELECTRIC EYE

High-speed photo-electric counting equipment adaptable to a variety of industrial uses is offered by the Lipman Engineering Co., Pittsburgh, Pa. Type PC-3 equipment, supplied complete with photo-electric amplifier and contact relay unit, light source with adjustable bracket, power-supply control box and counter in four- or six-digit models, is capable of 600 counts per minute, or 36,000 per hour. Polarized plugs are used for connections and permit service or replacement of a unit in several seconds. Estimated tube life is 7,000-10,000 hours.

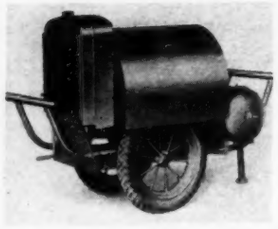
COMPRESSORS

Ingersoll-Rand Co., New York City, has redesigned the larger four-cylinder units of its line of "PRE" direct-connected synchronous-motor-driven compressors, built in sizes



from 700 to 3,000 hp. These now embody a simplified arrangement of cylinders and intercoolers which is said to increase accessibility and efficiency of operation. Other improvements include the use of a new "turret-type" channel valve which provides greater valve area for the larger cylinders.

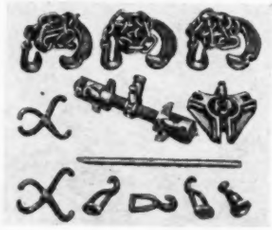
A new small three-cylinder lightweight compressor for use in "tamping up" low spots in track and other light work on track or bridges and buildings also is announced by Ingersoll-Rand. Known as the Model 55 spot tamper, the new machine consists of a single-stage compressor of 55 c.f.m. actual delivery capacity, direct-connected to a four-cylinder water-cooled gasoline engine. The entire unit is mounted on



a substantial chassis fitted with end rollers or either pneumatic-tired or plain steel wheels. The wheels can easily be removed if the roller arrangement is preferred. Rollers have grease-packed ball bearings. The unit is supplied with a substantial housing which can be locked in place so that pneumatic tires cannot be stolen. The dolly car for the unit is all steel and weighs 360 lb.

MULTIPLE TOOL

Several pieces of equipment used in various combinations to perform innumerable jobs in mine operation and maintenance, designated as the "Util-A-Tool," are offered by Templeton, Kenly & Co., Chicago. This new multiple tool comes in a compact metal carrying case with complete instructions and suggestions for use.



Its many applications include: spreading and pulling together structural members or any movable objects within its 10-ton capacity, pushing, hoisting, lifting, lowering, clamping, bracing and tensioning. It also quickly removes gears, wheels and pulleys, according to the manufacturer. Five sizes are available.

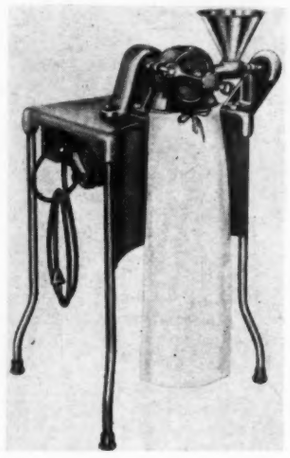
ADJUSTABLE-SPEED DRIVE

An all-electric a.c. adjustable-speed drive which is said to employ a principle of speed control heretofore confined to large units has been developed by Reliance Electric & Engineering Co., Cleveland, Ohio. The new drive consists of a control unit and an adjustable-speed motor which is applied directly to the machine to be driven. This speed-changing combination is designed to bring to users of small motors (from 1 hp. up) an economical means of varying operating speeds over as much as a 12 to 1 range.

Known as the Reliance V*S drive, all of the new unit's electrical and mechanical parts are similar to those handled regularly in the maintenance of any plant, however small. Of vertical construction, it occupies a minimum of floor space; three screws are all that are required to fasten its base to the floor or other support, and no careful leveling is needed.

SMALL PULVERIZER

A small portable pulverizer suitable for coal analyses, called the Bantam, has been placed on the market by the Pulverizing Machinery Co., Roselle Park, N. J. After long



and gruelling tests on many materials, according to the maker, it is finding use on small production and laboratory jobs. It is said to be dustless, accessible and easy to clean.

RUST INHIBITOR

A new line of products designed to inhibit rust and corrosion has been announced by the industrial lubrication department of the Standard Oil Co. of New Jersey under the trade name "Rust-Ban." These new coatings not only contain various conventional petroleum ingredients which themselves act as a protection against rust, says the manufacturer, but also employ a new and special rust inhibitor which greatly increases this protection.

They are said to combine ease of application, durability, impermeability and sufficient elasticity to prevent cracking due to expansion and contraction with temperature changes. They also are recommended as possessing characteristics of freedom from hardening or cracking, peeling or slipping from the metal surface. They may be readily removed with petroleum solvents. Since these coatings provide lubricating films, they need not be removed for many subsequent uses of the treated part.

BELT IDLERS

Improved roller-bearing troughing and return idlers are offered by Robins Conveying Belt Co., New York City. The malleable-iron supporting brackets are of stream-lined design and crescent section to given maximum strength. The new triple-seal assembly to prevent escape of grease or entrance of grit or moisture is used in both the troughing and return idlers, as also is the single-shot lubricating system. The troughing idler shaft and pulley assembly may be completely dismantled and reassembled without the use of tools; the return idler shaft and pulley assembly may be lifted out between the conveyor stringers for inspection or adjustment and may be easily replaced without disturbing the bracket connections.

LUBRICATION FITTING

Keystone Lubricating Co., Philadelphia, Pa., has added to its line of Keystone BB fittings a new combination type fitting. When this is employed, says the company, it is unnecessary to install a high-pressure fitting, as the ball head of the combination unit is designed for direct contact with the nozzles of standard push-type or hydraulic high-pressure grease guns. The new fitting embodies all the features of the standard fitting with the added advantage of the ball head integral with the fitting.